MAY 14, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

A PROGRAM FOR MANAGEMENT IN 1956 . . No. 4

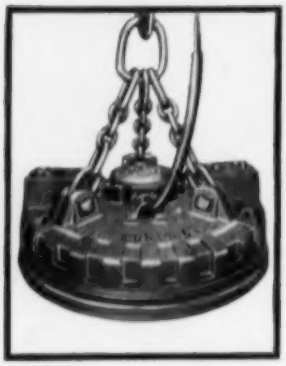
Metalworking Goes to Market

—page 107

CONTENTS — PAGE 5

NEW LIGHTWEIGHT EC&M 55" MAGNET*

- HANDLES LIGHT SCRAP AT LOWER COST
- WEIGHS UP TO 25% LESS WITH COMPARABLE LIFTING CAPACITY
- FASTER OPERATION OVER WIDER WORKING RADIUS

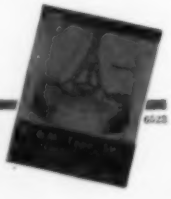


* Companion to the EC&M 45" Lightweight Magnet

This new magnet, developed by EC&M engineers, is the lightest weight 55-inch magnet. High strength and water-tight construction are maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding also keeps pole shoes tight.

Introduced less than a year ago, the EC&M lightweight 45-inch magnet has already become popular because its faster maneuverability and greater working radius permit more trips per day. The new 55-inch magnet incorporates the same profitable advantages. Get the facts . . . and note how these lightweight magnets can cut your light scrap handling costs.

Write for Bulletin 900-L



THE ELECTRIC CONTROLLER & MFG. CO.

Division of Square D Company

4498 Lee Road • Cleveland 28, Ohio

He keeps large inventories – so that you don't have to!

Users of steel know that maintenance of inventory can often be a costly headache. It ties up capital and space. It usually requires expensive equipment for the handling and processing of stock. It increases insurance costs, and necessitates additional clerical and storeroom help.

What's the best answer? For the buyer of steel in small and moderate lots, the answer is a simple one. He can so easily get his supplies from the "warehouseman"—the local distributor of steel products!

A great many of these distributors throughout the country handle Bethlehem products. They keep big inventories—sheets, strip, bars, plates, structurals, tool steel, rod and wire, hardware, and other items. They maintain these extensive inventories so that you, the buyer, won't have to. They're in business to supply you with steel, and their purpose is to have what you want at all times.

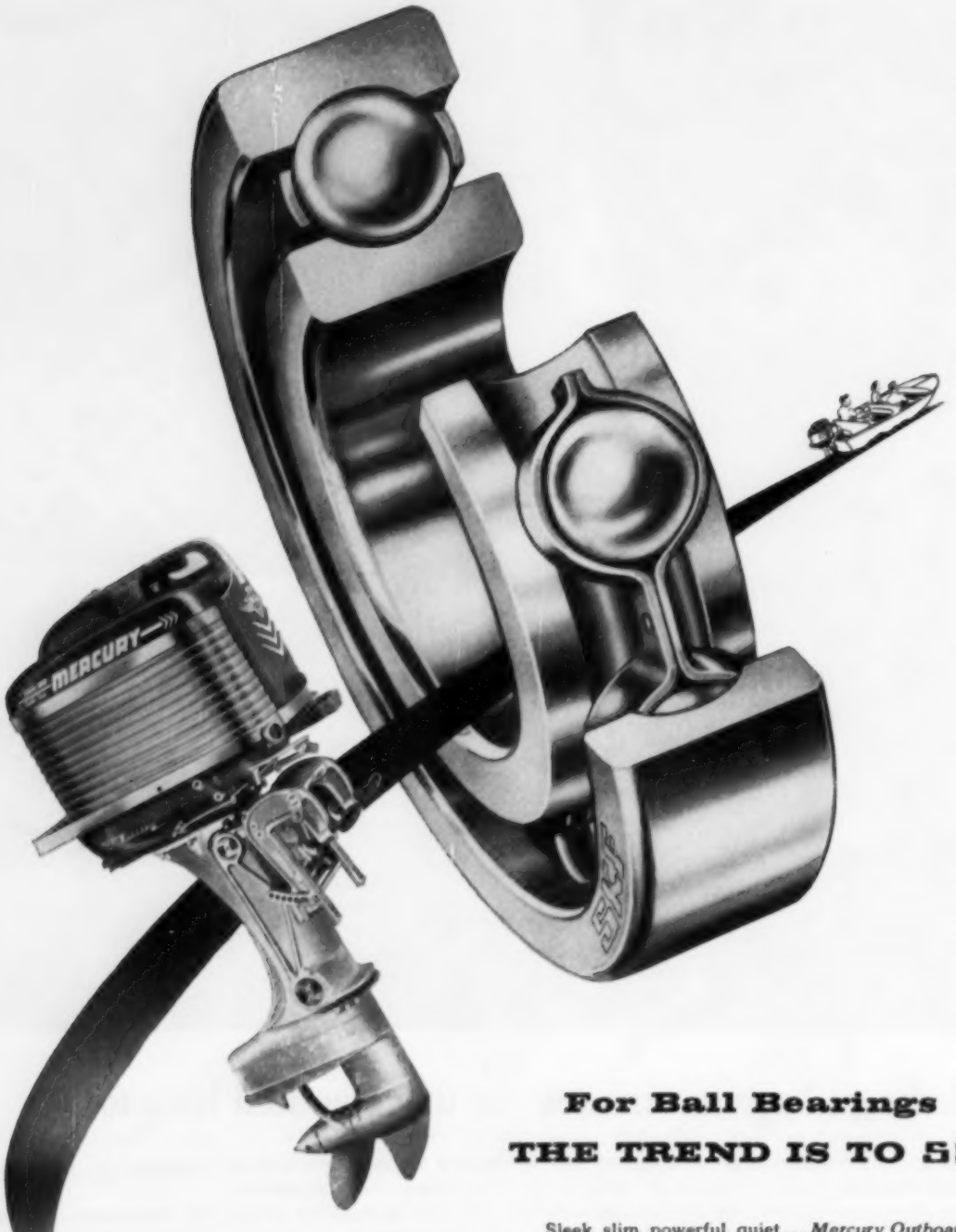
They're equipped for service, too—for shearing, edging, slitting, flame-cutting, sawing, and other operations that "tailor" the steel. And many of these firms can give you expert technical advice and even laboratory help.

If you are beset by problems involving steel, you'll often find help at the nearest Bethlehem distributor's. Give him a ring, whether your order is large or small; you'll find him cooperative, friendly, and always geared for fast delivery.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation
San Francisco

BETHLEHEM STEEL

Call the distributor – your Shopping Center for Steel



For Ball Bearings
THE TREND IS TO SKF®

Sleek, slim, powerful, quiet ... *Mercury Outboards* are the ruler of speed and spray – "Master of the Waterways." Kiekhaefer Corporation, who makes them, was first to feature extensive use of anti-friction bearings in outboards. And Kiekhaefer is another concern that purchases single row, deep groove ball bearings from SKF.

It's a trend ... brought about because those whose business is to buy bearings recognize the improvements SKF has achieved in ball bearings – improvements in quiet running, improvements in sealing, improvements in bearing life. Maybe *you* too should switch to SKF Ball Bearings.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

7709

SKF

has them all

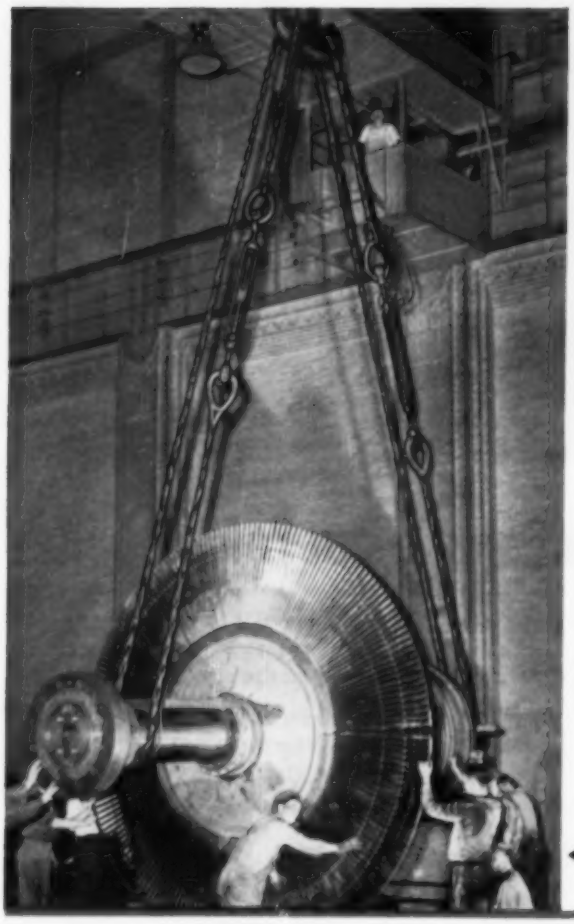
Ball Bearings ○ Cylindrical Roller Bearings ⊂
Spherical Roller Bearings ⊂ Tyson Tapered Roller Bearings ⊂

Two ATLAS Type 1, Round-Braided Slings handling 125-ton refinery vessel.

Two ATLAS Type 1, 8-part Round-Braided Slings handling 35-ton gear drive unit.

These specially balanced slings

make material handling safe, fast, and easy!



ATLAS slings are specially constructed to give you safe and easy handling of materials.

Because these slings are flexible and easy to handle, loads can be handled faster. This maximum flexibility permits the sling to hug the load with a safe, full-gripping contact. Because of the balanced ATLAS construction, each rope in the body carries an equal share of the load. These features give safe, fast, low cost handling.

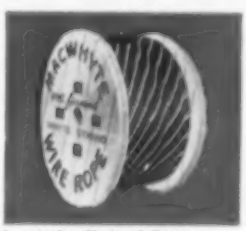
If our wide variety of custom sling types and sizes doesn't include the sling you need, we will be glad to custom-design and custom-make slings for you.

Call your Macwhyte distributor for prices, literature, or catalog; or write direct to Macwhyte Company.

MACWHYTE SLINGS

Macwhyte Company, 2712 **Fourteenth Avenue, Kenosha, Wis.**
Manufacturers of: Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies.

MILL DEPOTS:
New York 4, 35 Water St.
Pittsburgh 19, 704 Second Ave.
Chicago 6, 228 So. Des Plaines St.
St. Paul 14, 2356 Hampden Ave.
Ft. Worth 1, P.O. Box 605
Portland 9, 1603 N. W. 14th Ave.
Seattle 4, 87 Holgate St.
San Francisco 7, 188 King St.
Los Angeles 21, 2035 Sacramento

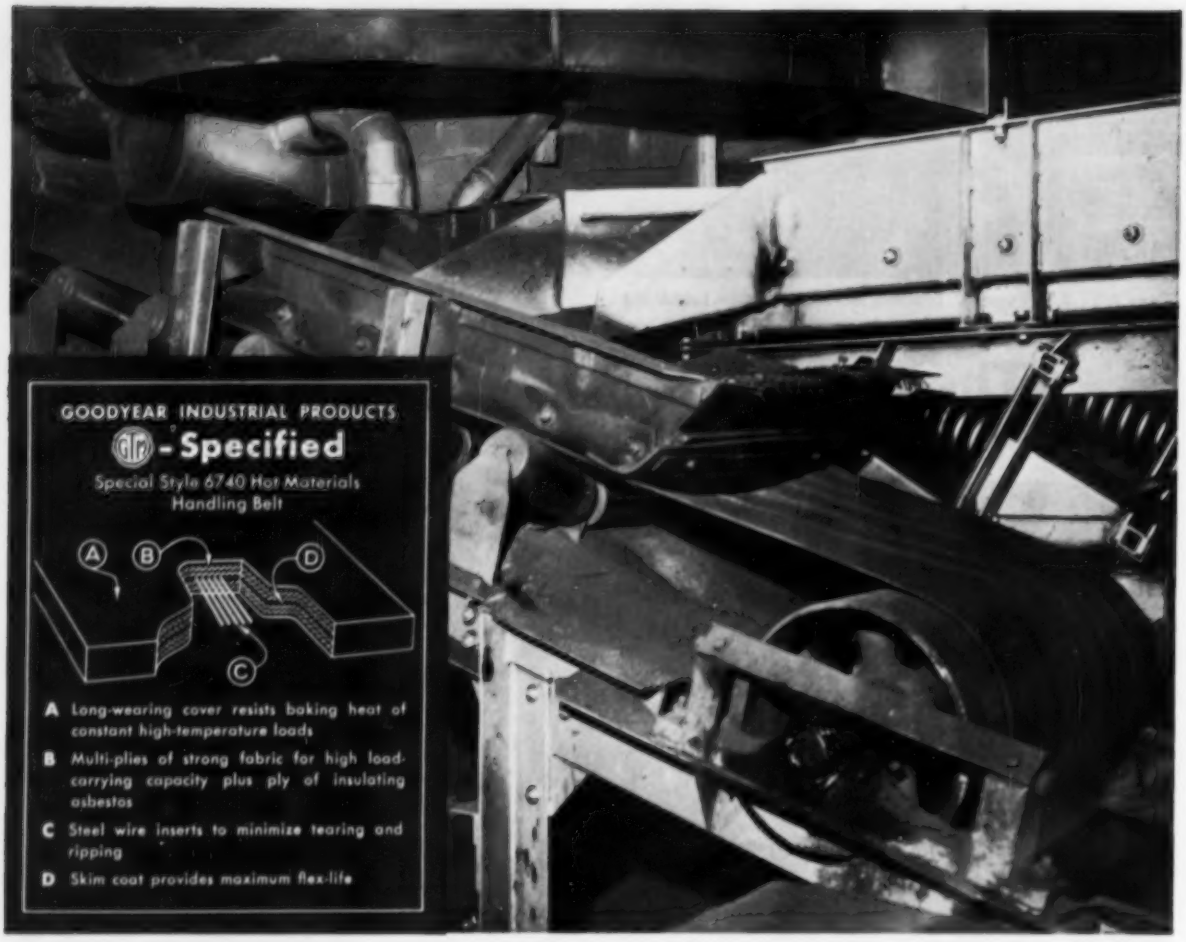


Distributors and mill depots throughout the United States.

← Two ATLAS Type 5, 8-part Round-Braided Slings with jaw and jaw turnbuckles precision handling a 50-ton turbine rotor.

Here's ATLAS balanced braided sling construction

1. One right lay and one left lay wire rope are each spliced endless.
2. These ropes are hand-braided to form a round sling body.
3. All ropes in the body react in the same manner when loaded and each rope carries an equal share of the load.
4. These features produce a lightweight, flexible, kink-resisting sling that hugs the load for safe and economical handling.


GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
Special Style 6740 Hot Materials Handling Belt
A
B
C
D
A Long-wearing cover resists baking heat of constant high-temperature loads
B Multi-plies of strong fabric for high load-carrying capacity plus ply of insulating asbestos
C Steel wire inserts to minimize tearing and ripping
D Skim coat provides maximum flex-life

G.T.M. Saves $4000/year on shake-out refuse belts

SHARP, hot shot, gates, risers and other scrap quickly tore and burned up refuse-handling belts at this automotive foundry. On the average, the 126′ belts only lasted two months. Usually large patches had to be put in the belt to get even two months' service.

Special, wire-inserted belts (see blueprint) and vulcanized, rather than steel-plate, splices were suggested by the G.T.M.—Goodyear Technical Man. Result: *Service averages six months with $4000 annual savings.*

Your belt or other industrial rubber problems may be similarly solved by the G.T.M. and your Goodyear Distributor. Call them, today! Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

STYLE 6740 CONVEYOR BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

STEEL
The Metalworking Weekly

MAY 14, 1956
Vol. 138 No. 20

METALWORKING OUTLOOK, 61

The Editor's Views, 65

Strike in Steel? 67
Tough union demands worry industry

Management at Work, 77
Reed's Grundy: Toolmaker for oil

Program for Management, 107
Metalworking goes to market

Top Jobs Go Begging, 69

Extrusions: Tailor-Made for Tough Jobs, 70

Founders Stage a Show, 71

Steel Warehousemen Prepare for Growth, 72

Where Engineering Graduates Go, 73

Screwmakers See Upturn, 79

Windows of Washington, 74
Mirrors of Motordom, 81
The Business Trend, 85
Men of Industry, 89
New Products, 161
Behind the Scenes, 6
Letters to the Editors, 10
Calendar of Meetings, 27
Progress in Steelmaking, 126
New Literature, 186

TECHNICAL OUTLOOK, 117

Process Controls for Powdered Metals, 118
They can cut scrap, insure quality, increase profits

Design for Heat Transfer, 122
Sheets with formed-in tubes open new markets

Heat Treat Line for Aircraft Steels, 124
Vertical furnace moves with the metal

Climate for Progress, 152
GM's new Technical Center: Built for tomorrow's challenge

MARKET OUTLOOK, 193

Steel Operations, 193
Price Comparisons, 194
Nonferrous Roundup, 196
Nonferrous Prices, 198
Steel Prices, begin 200
Scrap Prices, 218

Editorial & Business Staffs, 16. Advertising Index, 222. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 W. 39th St., New York 18, N. Y.

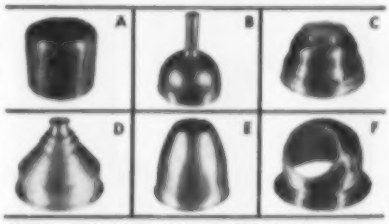
Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscription in the United States and its possessions, Canada, Mexico, Cuba, Central and South America, $10 a year; all other countries, $20 a year. Single copies (current issues), 50 cents. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.

YOUR NEW DESIGN
SHOWS
PROFITS
SOONER

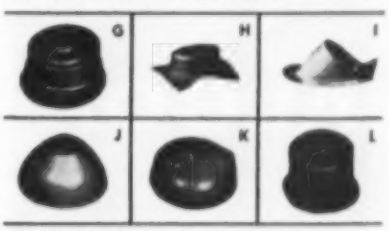
When Sketched on
ROLAND TEINER SKETCHFORM SETS

Makes clean copies instantly, without carbon paper. Keyed block background in light grey aids sketching and permits quick reference to details when discussing by telephone. Write Roland Teiner, Everett 49, Mass. for free copies. Use them to request quotations, order models or to develop cost reducing engineering changes.

TRY TEINER
for all fabrications including metal spinning, spinforming, hydroforming, welding and finishing.



METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Handle lamp; C—Lamp shade; D—Lamp base; E—Electronic cover; F—Compass cover.



HYDROFORMING:
Typical items: G—Appliance cover; H—Jet engine detail; I—Aircraft detail; J—Jet engine detail; K—Cleaner cover; L—Motor housing.

ROLAND TEINER
Company, Inc.
DEPT. 28 - 134 TREMONT STREET, EVERETT 49, MASS.
Telephone EVerett 7-7800
ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

FILL OUT COUPON FOR FACTS, SAMPLES!

ALUMINUM COMPANY OF AMERICA
2250-E Alcoa Bldg., Pittsburgh 19, Pa.

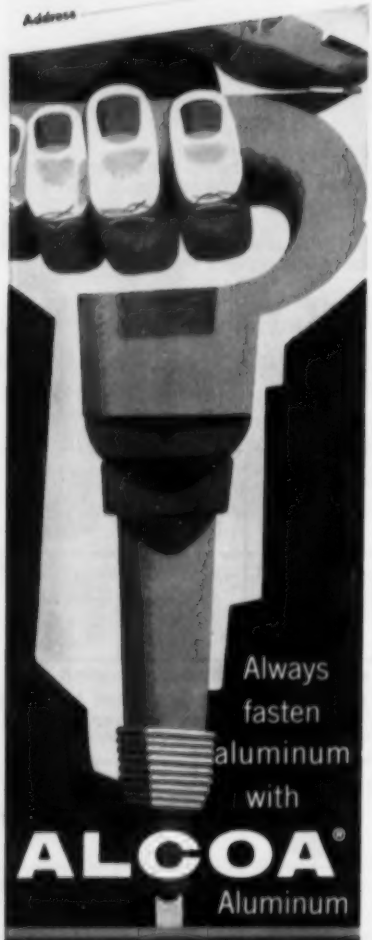
Gentlemen:
Please send complete specification data and samples of your aluminum fasteners.

Name

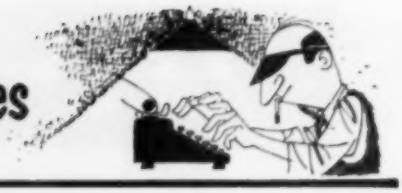
Title

Company

Address



behind the scenes



Schoolroom Capitalism

The American Zinc, Lead & Smelting Co. is going to high school these days. Edward Schweikardt, senior history teacher, Nyack high school, Nyack, N. Y., tells all about it in a most interesting booklet published by American Zinc. "Why," Mr. Schweikardt asked himself, "in a democracy, of all places, should there be a feeling that enterprise is for a few? How can we watch the process of money being used as a tool?"

Sydney Bradshaw, member of the New York Stock Exchange and civic-minded resident of Nyack, proposed to help out. He supplied Schweikardt's students with booklets, corporation records and stock records, and even threw in a few lectures on the factors to be taken into consideration before an investment is made. The students studied everything available, kicked in two-bits apiece, and bought 1 share of American Zinc. Then they all gathered around to watch money being used as a tool. Great excitement swept through the school when the first dividend check arrived; it was for 25 cents.

"A 5.4 per cent yield rang a bell with the students," Mr. Schweikardt reported. "Here was proof that $18.50 could mean ownership and production —and an income, as well."

When American Zinc learned about this project, it was pleased and flattered. Howard I. Young, president of American Zinc, plans to visit Nyack high school and address his company's student-stockholders.

"This is about the most inspiring bit of public relations I've ever seen," declared Associate Editor Robert Jaynes, when he rushed into our coop and thrust the Schweikardt booklet under our finely chiseled and mooselike nostrils. "It has got everything: Education, advertising, youth, finance, business and investment. By George, it strengthens one's belief that the future of America will be in good hands."

He stole that sentence from the last paragraph in the pamphlet.

Eye Catcher

In last week's STEEL, on pages 38 and 39, a most remarkable ad caught our appreciative attention: The Ironsides Co., Columbus, O., parlayed plenty of white space, some beautiful script, an artistic crayon portrait of John Butler Tytus and a column and a half of interesting copy into as dignified a spread as we've seen in some time.

Billed as No. 1 in a series of great names in steelmaking, it is an excellent start. The Ironsides people refer to themselves as "custom tailors" of lubrication, and even though ol' Shrdlu is a dead loss as a prospect, he is going to be one of their most attentive readers.

"THIMK"

To remind him that careful planning is the best groundwork for success, STEEL's Marketing Director Dave Kiefer has the following sign hanging over his desk:

PLAN AHEAD

Weight Guessing

R. W. Ohmeyer, Norden Laboratories, White Plains, N. Y., catches up on several older puzzles, which reminds us that we had better do the same. There could have been two grease-spotted tables, as you have already discovered: One 10 in. in diameter, and the other 50 in. The moonshiner's tank was 3 ft 6 in. plus in diameter. The first man to sail completely around the world was not Magellan. ("Red" Stewart of Sharon, Pa., cleverly suggests that it was the "man in the moon.") Some historians say it was a Filipino sailor who was picked up by the Portuguese in the Orient, and taken west. Then he sailed westward with Magellan. And to wind up, here's a quickie: Can you list these parcels in the correct order of their weight? 1. A peck of potatoes. 2. A bushel of barley. 3. A barrel of beer. 4. A gallon of water. 5. A sack of flour. 6. A gallon of blood. 7. A bushel of lime. 8. A pint of gold dust. 9. A gallon of earth. 10. A bushel of oats.

Shrdlu

(Metalworking Outlook—Page 61)

5 THREADING PASSES ELIMINATED By LANDIS Centerless Thread Grinders

BENDIX - WESTINGHOUSE in Elyria, Ohio, recently installed two *LANDIS* #1 Centerless Thread Grinders for threading slack adjuster gear worms used in automotive air brakes. This new threading method resulted immediately in fewer threading operations, fewer rejects, savings in critical materials, and longer product life.

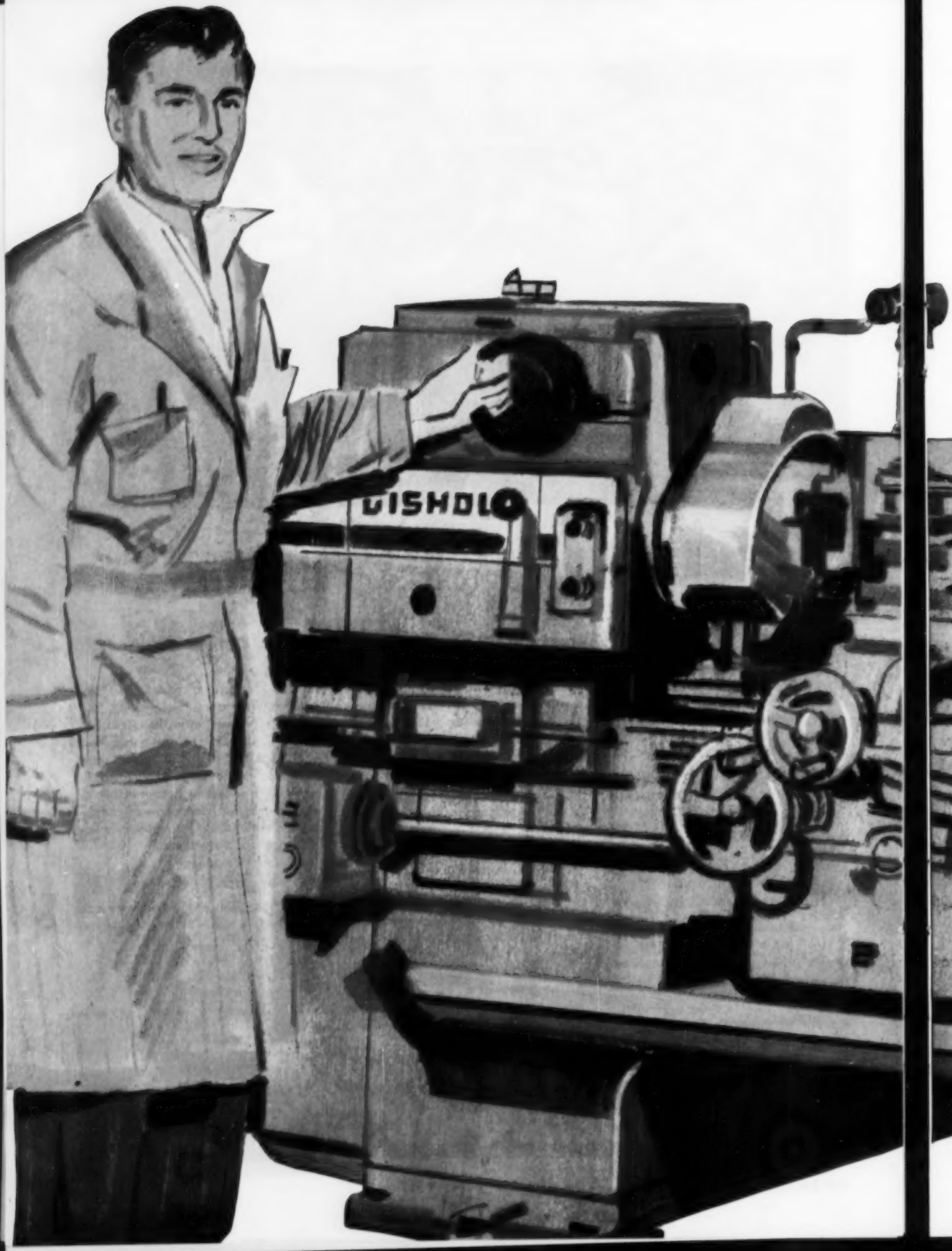
Gear worm blanks are made of alloy steel, heat-treated to a 285-311 Brinell hardness. Former methods had required 7 separate passes to complete the threads. Threads were rough-cut before heat-treating in one pass, then finish-ground in six passes after heat-treating.

Using the *LANDIS* Centerless Thread Grinders, threads are now completed after heat-treating in two operations. Both machines are arranged for "up-grinding", a method developed by *LANDIS*, which allows up to 30% greater work surface speeds while maintaining concentricity and finish. Upgrinding allows deeper cuts, and threads are finished in two passes. For example, on the machine producing 3½ pitch threads on 1¼" gear worms, roughing takes a .108" cut, finishing .089", with 8 pounds of metal removed every hour.

Other important advantages have resulted from the new process. By grinding threads after heat-treating, locked-in stresses are eliminated, and BENDIX-WESTINGHOUSE reports show that product life has been doubled. In addition, a reduction in the number of rejects and the elimination of a nubbing on the workpiece (formerly required to facilitate threading) has effected substantial savings of critical materials.

This successful production story can be retold in your plant. Centerless Thread Grinders, built exclusively in the United States by *LANDIS*, are designed for highspeed mass production of screw threads ranging from 1/16" to 4¾" in diameter. Please send specifications when writing for additional information.

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

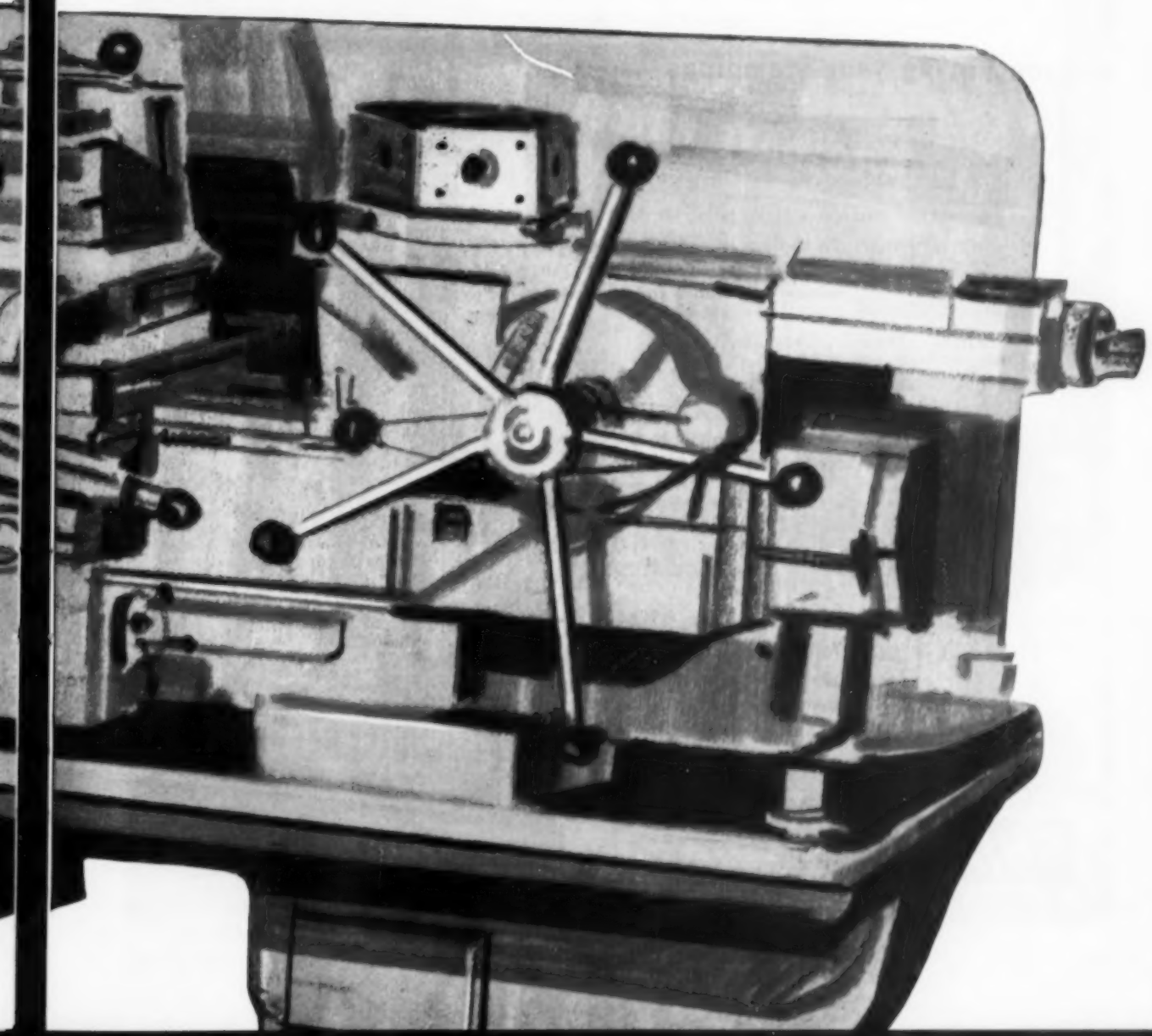

GISHOLO

GISHOLT MASTERLINE
RAM TYPE TURRET LATHE

Here is the latest Gisholt MASTERLINE Ram Type Turret Lathe, with many improvements and outstanding features to provide faster, easier operation, higher quality, quicker setup and lower maintenance. In short, it is designed to do your work faster, cheaper and better—and with a new minimum requirement for operator skill, attention and effort. Let us tell you more about these new machines, and discuss the possibilities of their profitable application to your particular manufacturing processes

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt



are you buying your stampings

at UP-TO-DATE PRICES?

Try us as a secondary or alternate source. You may be surprised at what our advanced methods can save you.

Costs, methods and techniques change rapidly in the stamping business, as in all business.

Through the constant development of new equipment, by producing our own multiple-use tooling, by perfecting unique time-saving procedures we're effecting great economies. Often, in fact, we can save our customers the cost of dies.

Frequently, of late, happy new customers have said to us, "We wish we'd known of your low prices before." Maybe this will be the case with you. Give us a try.

FOR FULL INFORMATION, send for our free, 12-page booklet "Service in Stampings." Or send us a blue print for a quote. These are the days when savings count!

LAMINATED SHIM COMPANY, INC.

STAMPINGS DIVISION

"ONE PIECE OR A MILLION"

3405 Union Street, Glenbrook, Conn.

LETTERS
TO THE EDITORS

Article on "Must Read" List

I am both delighted and impressed by STEEL's consistently high standard of performance. Your 1956 Program for Management hits a new high in performance and is certainly "must" reading for all metalworking executives. The second article in the series, "Know Your Costs" (Mar. 19, page 83), hits the bull's-eye in one of management's most important targets today.

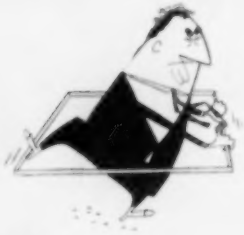
I am the manager of four associations in the metalworking field—the Investment Casting Institute, the Multiple V-Belt Drive & Mechanical Power Transmission Association, the Caster & Floor Truck Manufacturers' Association and the Air Compressor Research Council—and I want to be sure that the top executives in each of these read this article. May I have 150 copies?

I would like to have also 150 copies each of the editorial, "Break the Cost Barrier" (Mar. 19, page 41) and the editorial, "Why Cut Prices?" (Nov. 14, page 57).

Keep up the good work.

H. P. Dolan
Executive Director
Investment Casting Institute
Chicago

Is He Getting a Square Break?



Thanks for your complimentary service of STEEL.

Do you realize that if the present system of government purchases continues, it will not be long before there will be few small business concerns? Although I said "few," there actually will be none left to be interested in steel or anything else.

The mortality rate of such concerns is growing by leaps and bounds because unreasonable and absurd conditions are imposed upon the little operator who is foolish enough to quote a "fixed" or set price.

This is something to think about. The little fellow is not getting a "square break."

R. K. Tyra
R. K. Tyra Corp.
Tyra, Minn.

Data Are of Great Assistance

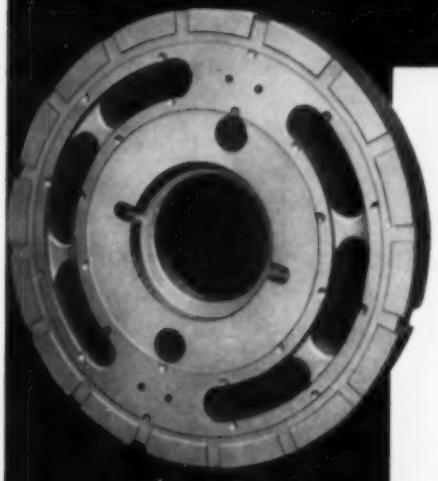
The Apr. 2 issue contained the comprehensive report, "Financial Analysis of the Steel Industry for 1955," and this information has been of great assistance to us. We would appreciate further data on these items:

1. Average hourly rates of employees

(Please turn to page 12)

SALT BATH HEAT TREATING

Eliminates Atmosphere Problems



TYPICAL!

This Vasco B.B. steel valve plate was a heat treater's "nightmare"—until Ajax salt baths were put on the job. Under conventional heating methods, plates invariably cracked and hardness response was only Rc 52. Martempering and drawing in Ajax baths produced Rc 60-64 . . . without cracks, warping or surface defects.

Good-bye to scale and decarb!

All air is "sealed out" by the molten salt! Parts come from an Ajax salt bath furnace clean and scale free. There is no pitting. Even when parts are transferred from one bath to another, a film of molten salt clings to parts, protects them fully to the instant of quenching. Scale and decarb are avoided.

Other Ajax salt bath advantages include: Distortion is held to a negligible minimum. Outstandingly uniform heating because electrodynamic stirring action maintains even temperatures *in all parts of the bath.* Costly finish grinding or straightening *after* heating is either greatly reduced or eliminated.

25th YEAR

AJAX

HULTGREN

electric SALT BATH furnaces

Cost-savers for . . . practically any heat treatment
. . . practically any alloy.

ASSOCIATE COMPANIES:
Ajax Electrothermic Corp., Trenton, N. J.
—High frequency induction furnaces
Ajax Electric Furnace Corp., Phila., Pa. } Low frequency
Ajax Engineering Corp., Trenton, N. J. } induction furnaces

MAIL COUPON FOR CASE HISTORY BULLETINS

AJAX ELECTRIC COMPANY,
952 Frankford Ave. Philadelphia 23, Pa.

Send actual Case History Data on applications checked:

- ☐ Austempering—Martempering
- ☐ Carburizing, Cyaniding
- ☐ Annealing
- ☐ Hardening
- ☐ Brazing
- ☐ Cleaning, Descaling, etc.
- ☐ Other _____

☐ **Check here for free HEATING TIME CALCULATOR for salt baths.**

Name _____ Position _____

Firm _____

Address _____

You wouldn't know they're safety spectacles until they're needed!

NOW—WILLSON DESIGN provides this *new concept* of style combined with protection—ideal for day-long wear!

You'll see a dramatic difference in this protective eyewear that's styled for greatest worker acceptance! New *wide-vision* lenses. New popular plastic frame styles. New designs that add distinctiveness to safety spectacles at last!

Workers will wear them willingly—with the Willson "Super-Tough" lenses prescription ground, if desired—because these new styles are as handsome as frames can be!

A full range of eye, bridge and temple sizes have been developed into attractive eyewear by the Willson Research Center. Ask your Willson distributor to show you the WF line soon.

Style WF
new wide-vision frame shape in flesh-color butyrate; spatula or half plastic-half cable temples

Style WFD
demi-amber wide-vision butyrate frame; matching spatula temples

Style WFB
popular Willson Bronze, wide-vision frame; spatula or half plastic-half cable temples

Style WFH
wide vision lenses, spatula temples—in new half-frame design (demi-amber overlay on upper half of crystal butyrate frame)

Over 300 safety products carry this world-famous trademark

WILLSON
PRODUCTS DIVISION
RAY-O-VAC COMPANY
233 Washington Street, Reading, Pennsylvania

LETTERS

(Concluded from page 10)

in each listed company by week or quarter.

2. Production of each listed company.

3. Prices of each company for hot and cold-rolled carbon sheet and strip.

4. Effects of a steel strike on producers or consumers.

William Barrie
Purchase Analysis Department
Special Products Division
Ford Motor Co.
Dearborn, Mich.

• *We have no data on the average hourly rates of employees in the various steel companies, but steel industry wage averages are given in the article, "Steel Wage Costs Climb" (Apr. 9, page 66).*

We know of no figures on production of sheet and strip, company by company.

Prices of sheet and strip, company by company, can be obtained from the weekly issues of STEEL.

We have no analysis of steel strike effects. In stories at the time of the strike, we mention how much production was lost or how nearly consumers were out of steel. We have observed that consumers usually operate longer than they think they can during a steel strike.

Job Hopping of Skilled Worker

I am interested in the article, "Skilled Workers Restless" (Apr. 2, page 53). Since this article names some of the problems we experience at the shipyard with job training and apprentice training, I would appreciate several copies which I will make available to our upper management personnel.

W. P. Reed
Training Superintendent
San Francisco Naval Shipyard
San Francisco

Firms Adopt Brainstorming

Your article, "Ideas for Industry" (Apr. 23, page 105), hit the bull's-eye with our staff people. We would appreciate six copies to help us get started on a similar program.

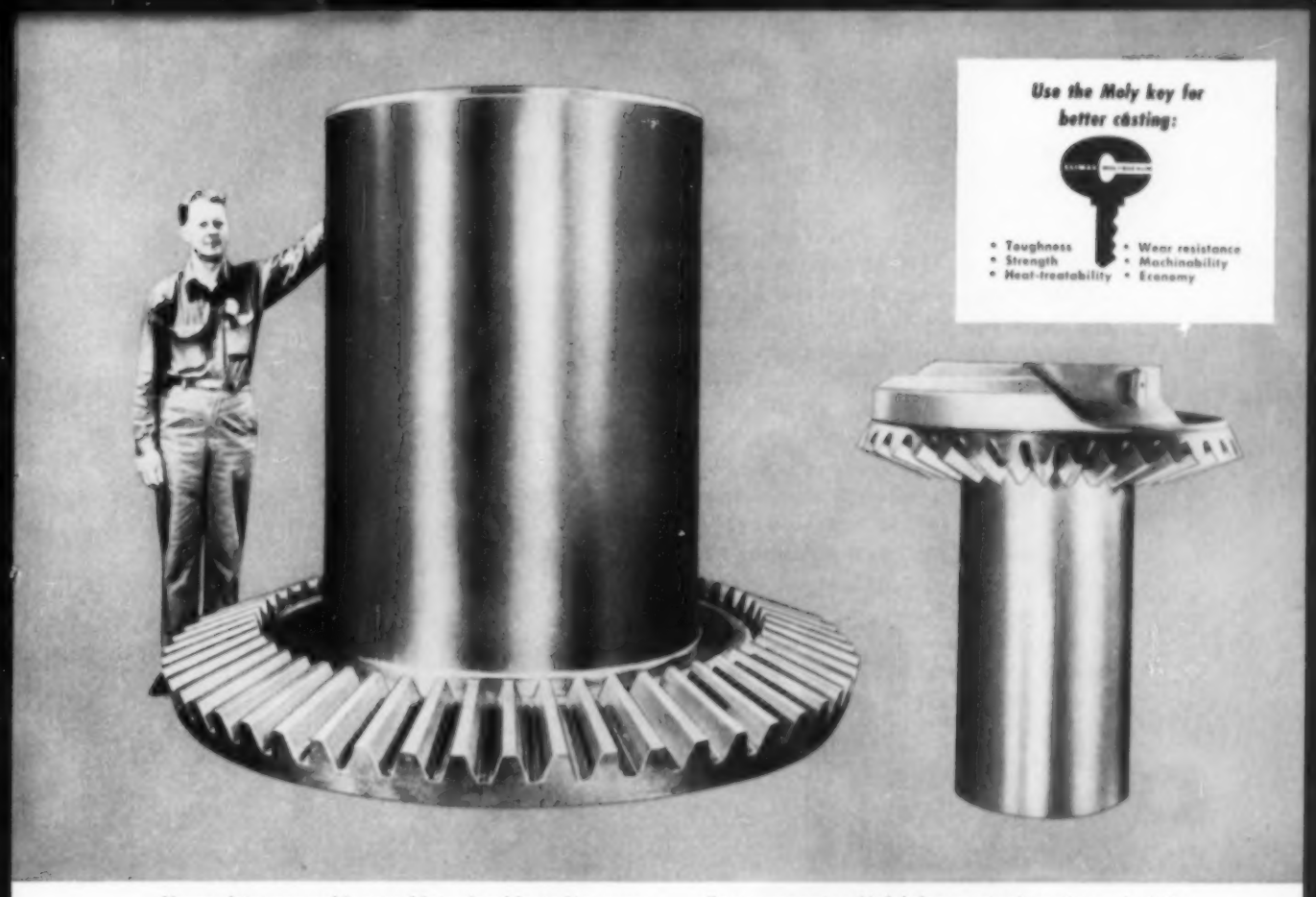
Denis Houser
Cumberland Case Co.
Chattanooga, Tenn.

We would appreciate six copies to be used in our training program.

Homer G. Ralph
Personal Relations
Zanesville Works
Armco Steel Corp.
Zanesville, O.

I am writing to ask for two copies. I find this article interesting and would like to use it for future planning with our young engineers.

F. G. Kerby
Chief Engineer
Automotive Division
The Budd Co.
Detroit



Heavy duty ore crushing machinery is subjected to severe operating conditions. To meet these strenuous requirements the gears shown are made from heat treated low-alloy manganese-Molybdenum steel castings. At left: a Symons Gyratory Crusher gear; right: a Symons Cone Crusher gear. Built by Nordberg Mfg. Co.

Cast Manganese Moly Steel contributes strength and toughness to Crushers built by Nordberg

"Where high strength and toughness are prime considerations," says Howard Zoerb, Consulting Engineer of the Nordberg Crusher Division, "molybdenum bearing steels are specified. This is true of the heavy duty parts of Symons® Crushers, built by Nordberg. These steels have contributed to the Nordberg reputation as producers of dependable, heavy duty crushing machinery."

Technical assistance is available to foundries on alloying problems. Please address inquiries on your foundry letterhead to: Climax Molybdenum Company, Department MF3, 500 Fifth Avenue, New York 36, New York.

The Symons Cone Crusher is a product of Nordberg Manufacturing Company.

CLIMAX MOLYBDENUM

You may not be

Every one of your machine tools is—in truth—a coin-operated machine. Before anything comes out, you have to put in "coin," even though you don't use nickels.

But it might be better if you did! For then you could spot the "one-arm bandits" before their take is revealed (or simply neglected) on your balance sheets or P&L statements.

You could go *right* to the best opportunities for making high-return investments. You could replace the lemons with jackpots.

Ask your production people for their recommendations and when they specify Avey, you can be sure of the results.

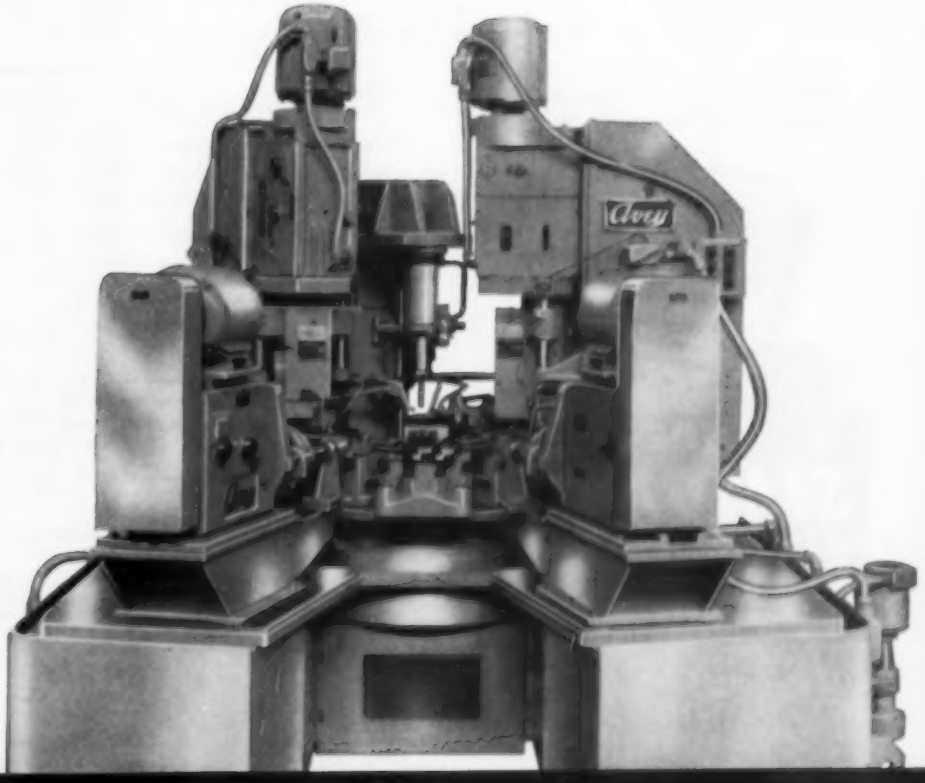
▸ **production data:** This 6-station Avey indexing machine performed drilling, tapping, milling, and broaching operations. Fixtures arranged to handle two different parts. Milling and broaching done in one pass, with cycle time of 8 seconds. Rate: 380 parts/hr. at 100% efficiency.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

in Las Vegas . . .

Avey



Fast Delivery

Quality

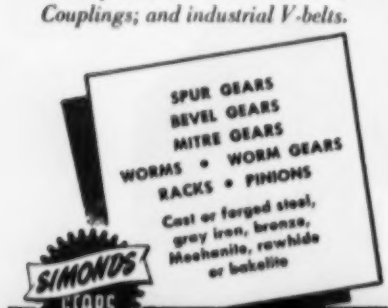
SIMONDS
INDUSTRIAL
CUT GEARS

★ FINISHED GEARS
★ CUSTOM GEAR CUTTING
★ HEAT-TREATED, CASE OR FLAME-HARDENED

You are sure of quality and prompt service when you place your industrial cut gear requirements with SIMONDS GEAR. We produce the full range of sizes in the types and materials you need from your blanks or ours. Let us quote on your next gear requirements.

* * *

Stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.



THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.
Quality Gears for over 60 years

STEEL
The Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH
Editor, WALTER J. CAMPBELL
Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. ROONEY ..... *Market Editor*
J. D. KNOX ..... *Steel Plant Editor*
HARRY CHANDLER ... *Copy Editor*
ALLEN G. GRAY ..... *Technical Editor*
ROBERT F. HUBER .... *Machine Tool Editor*

FRANK R. BRIGGS ..... *Associate Editor*
ROBERT O. JAYNES ..... *Associate Editor*
AUSTIN E. BRANT ..... *Assistant Editor*
BYRON E. KENNEL ..... *Assistant Editor*
ROSS WHITEHEAD ..... *Assistant Editor*
JOHN R. BOTZUM ..... *Assistant Editor*
MARY ANN STUVE ..... *Editorial Assistant*
VAN CALDWELL ..... *Associate Editor*
MICHAEL A. L. WEBSTER ... *Associate Editor*
GLENN W. DIETRICH .... *Assistant Editor*
MARY T. BORGERHOFF .... *Assistant Editor*
MARY ALICE LYMAN ..... *Assistant Editor*
EILEEN CORTES ..... *Assistant Editor*
JUNE TUTTLE ..... *Editorial Assistant*

THOMAS H. BRYAN, TOM WELSH, *Art Editors*
BEVERLY CLINE ... *Editorial Service*

Resident Editors

New York 17 ..... 60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
STANLEY B. STEWART
Murray Hill 2-2581

Chicago 11 ..... 520 N. Michigan Ave.
ERLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 ..... 2837 Koppers Bldg.
ROBERT M. LOVE
Atlantic 1-3211

Detroit 26 ..... 1249 Washington Blvd.
A. DONALD POSTMA
Woodward 3-3488

Washington 4 ... 1123 National Press Bldg.
JAMES P. MORRISSEY
Executive 3-6849

London, 2 Caxton St., Westminster S. W. 1
VINCENT DELPORT
European Editor

Editorial Correspondents

Birmingham ..... R. W. KINCEY
Birmingham 3-1121

Buffalo ..... GEORGE E. TOLES
Emerson 5355

St. Louis ..... HAMILTON THORNTON
Jackson 1-9281

Youngstown ..... GEORGE R. REISS
Riverside 7-1471

Los Angeles ..... NORMAN LYNN
Webster 5-3040

San Francisco ..... EDWIN HAVERTY
Yukon 6-5151

Seattle ..... R. C. HILL
Melrose 1895

Cincinnati ..... DICK HAVLIN
Beechmont 1-9607

Toronto, Canada ..... F. S. TOBIN
Empire 4-9655

Birmingham, England ..... J. A. HORTON

Paris, France ..... LEON JAUDOIN-PROM

Brussels, Belgium ..... PAUL DE KEYSER

Dusseldorf, Germany ... DR. HERBERT GROSS

BUSINESS STAFF

Advertising Director ..... H. G. ROWLAND
Advertising Service Mgr. ... DORIS MITCHELL
Production Manager .... A. V. ANDERSON
Promotion Director ..... S. F. MARINO
Classified Advertising ..... EVELYN DIETZ
Marketing Director ..... D. C. KIEFER
Circ. & Research Dir. ... N. R. LADABOUCHE
Circulation Manager ..... G. R. EBERSOLE
Direct Mail Service ..... AMY LOMBARDO
Reprints ..... JUNE SCHILENS

Advertising Representatives

New York 17 ..... 60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Philadelphia ..... 260 Wynnewood Ave.
Wynnewood, Pa.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. ... 12 Farmstead Lane
CALVIN FISHER JR.—Orchard 7-1756

Rochester, N. Y. ..... 317 Ridgeview Dr.
East Rochester, N. Y.
HAROLD A. DENNIS—Browning 2105

Pittsburgh 19 ..... 2837 Koppers Bldg.
J. C. SULLIVAN—Atlantic 1-3211

Cleveland 13 ..... Penton Bldg.
J. K. GILLAM, WM. J. D'ALEXANDER
Main 1-8260

Cincinnati 6 ..... 2215 Victory Pkwy.
E. L. FRANKE—Parkway 1-0711

Detroit 26 ..... 1249 Washington Blvd.
C. A. TALLINGER JR.—Woodward 3-3488

Chicago 11 ..... 520 N. Michigan Ave.
L. C. PELOTT, W. L. POLAND
Whitehall 4-1234

Los Angeles 48 ... 6262 Commodore Sloat Dr.
F. J. FULLER—Webster 1-6865

San Francisco 4 ..... 57 Post St.
Robert W. Walker Co.
Sutter 1-5568

Griffin, Georgia ..... 1106 Pine Valley Rd.
FRED J. ALLEN—Griffin 7854

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, O.
MAin 1-8260

GEORGE O. HAYS ..... *President*
RUSSELL C. JAENKE ..... *Executive Vice President*
FRANK G. STEINEBACH *Vice President and Secretary*
FRANK O. RICE ..... *Vice President*
JOSEPH P. LIPKA *Treasurer and Assistant Secretary*

BPA

NBP

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION

Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors and National Business Publications Inc.

FOR COMPLEX FABRICATION. In chemical plants, these Stainless Steel acid catchers are used to remove dilute sulfuric acid from gases. Continental Boiler & Sheet Iron Works in St. Louis fabricated the units. Notice the complicated curves in the helix plates, and the neat joinery . . . a tribute to fine craftsmanship and the workability of Stainless Steel.

FOR ABRASION AND CORROSION RESISTANCE. Oil can racks stand out in all kinds of weather, and the support strips are constantly rubbed and knocked by the heavy cans of oil. Modern Metal Products Company of Greensboro, N. C. makes the strips out of Stainless Steel so they will stay bright and new-looking, and never get banged out of shape.

NOTHING *can equal* *Stainless Steel*

In its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

FOR SANITATION. These Stainless Steel shelves are made by the Eastern Steel Rack Company, Boston, Massachusetts, for use in cold storage rooms. They are easy to clean, and offer a sanitary, corrosion-resistant surface for food products of all kinds.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

USS

UNITED STATES STEEL

"It was a ticklish job — shrink-fitting the world's largest plate mill roll"

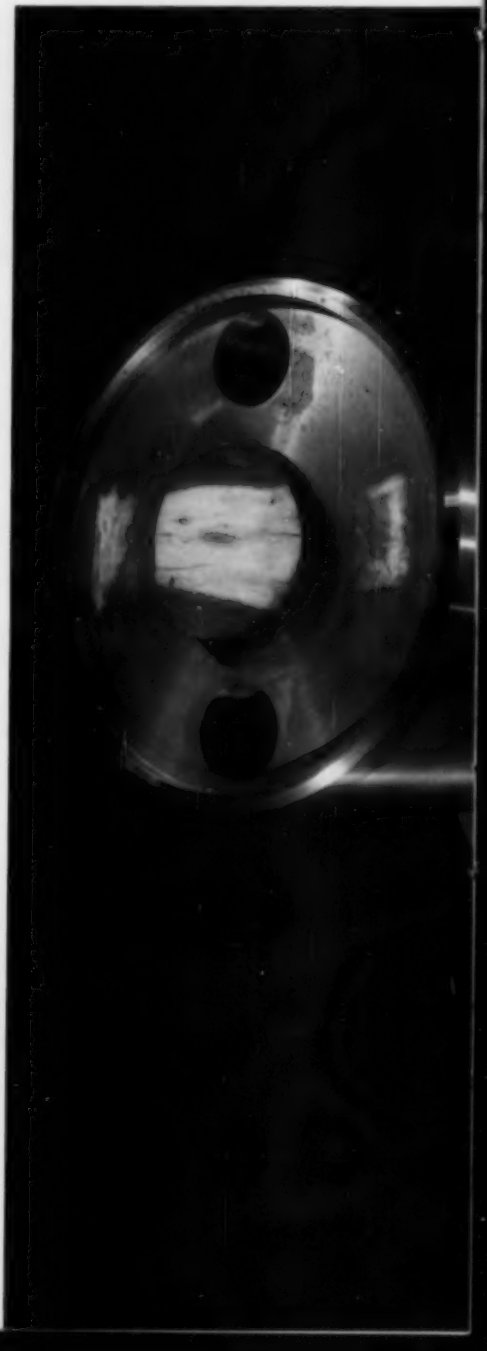
says **Harry Brinker,** *Asst. Division Supt., Homestead Forgings Division*

Although he has spent over 40 years in the forge shop, even Harry Brinker was impressed with, and proud of the arbor sleeve back-up roll shown here. It is being shipped to Ruhrstahl AG., a large German basic steel producer.

The arbor is about 29 feet long and 4 feet in diameter. It is a USS Quality Forging, heat treated and machined. Encasing this arbor is the roll body, a sleeve about 13 feet long and 6 feet in diameter. This also is a USS Quality Forging, heat treated and machined. The complete roll weighs 121 tons.

The steel is nickel-chromium-molybdenum-vanadium alloy, heat treated to 52 Shore for the arbor, and 60 Shore for the sleeve. But the tough part of this job was the shrink fit. Both pieces had to be machined with great care. Then the outer piece was heated and slipped over the arbor, using carefully developed techniques to position it exactly before it cooled and shrank to form an inseparable bond with the inner piece. In fact, it was U. S. Steel's unique experience with this type of fabrication that led Ruhrstahl to come 4,000 miles for this roll—the largest of its type ever produced.

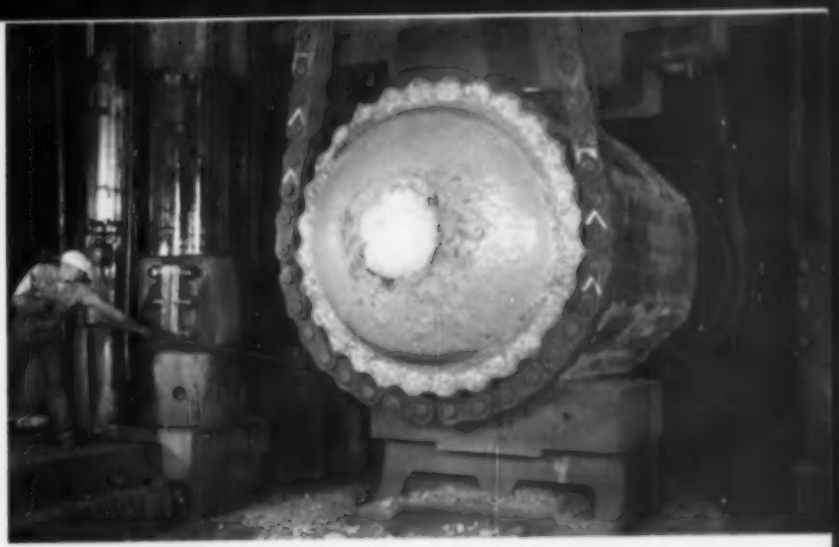
USS Quality Forgings are discussed in a booklet that is free upon request. Please address inquiries or requests for the booklet to United States Steel Corporation, Room 5355, 525 William Penn Place, Pittsburgh 30, Pa.



USS QUALITY FORGINGS

- heavy machinery parts . . . carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- specialty forgings of all types

UNITED STATES STEEL



You get the best flooring for the job at U. S. Steel Supply

No matter what your flooring requirements, you'll find just what you want at your local U.S. Steel Supply warehouse. We carry big stocks of three well-known flooring lines. There are rugged, heavy-duty USS Multigrip Floor Plates for use on entire floor areas, aisles, steps, ramps and loading platforms. Strong, lightweight U. S. Gypsum Grate-X—with its open mesh—lets light and air pass through, and gives good traction for catwalks and stairs. Plain or serrated grating, welded or riveted, comes in a wide variety of styles for industrial walks, bridge decking and other areas where an anti-skid lightweight flooring is needed. Stair Treads are also available.

U. S. Steel Supply will cut and form flooring to meet your exact mechanical requirements. Our engineers will help you select the best type of flooring for the job, and give you technical assistance on installation problems.

You'll find it pays to make U. S. Steel Supply your flooring headquarters.

U. S. STEEL SUPPLY

DIVISION

General Offices: **208 So. La Salle St., Chicago 4, Ill.** **Warehouses and Sales Offices Coast to Coast**

UNITED STATES STEEL

Harnessing heat for safety's sake

3M ADHESIVES

A temperature of 215° F. is just too hot to handle, no matter where you find it. Yet today's wall-type room heater must operate at just such a temperature *inside*, while staying cool enough on the *outside* so that even a child can touch it in perfect safety. What's behind this bit of modern insulation magic? A 3M product called EC-321—the versatile adhesive you see in action above.

Applied quickly and easily by spray, EC-321 has "quick strength" . . . takes a gentle grip on the insulation immediately upon contact, simplifying the manufacturer's assembly operation. Then the adhesive dries to form a lasting bond that *keeps* the insulation at its cooling job—without a slip—despite the boiling-hot temperatures generated inside the heater.

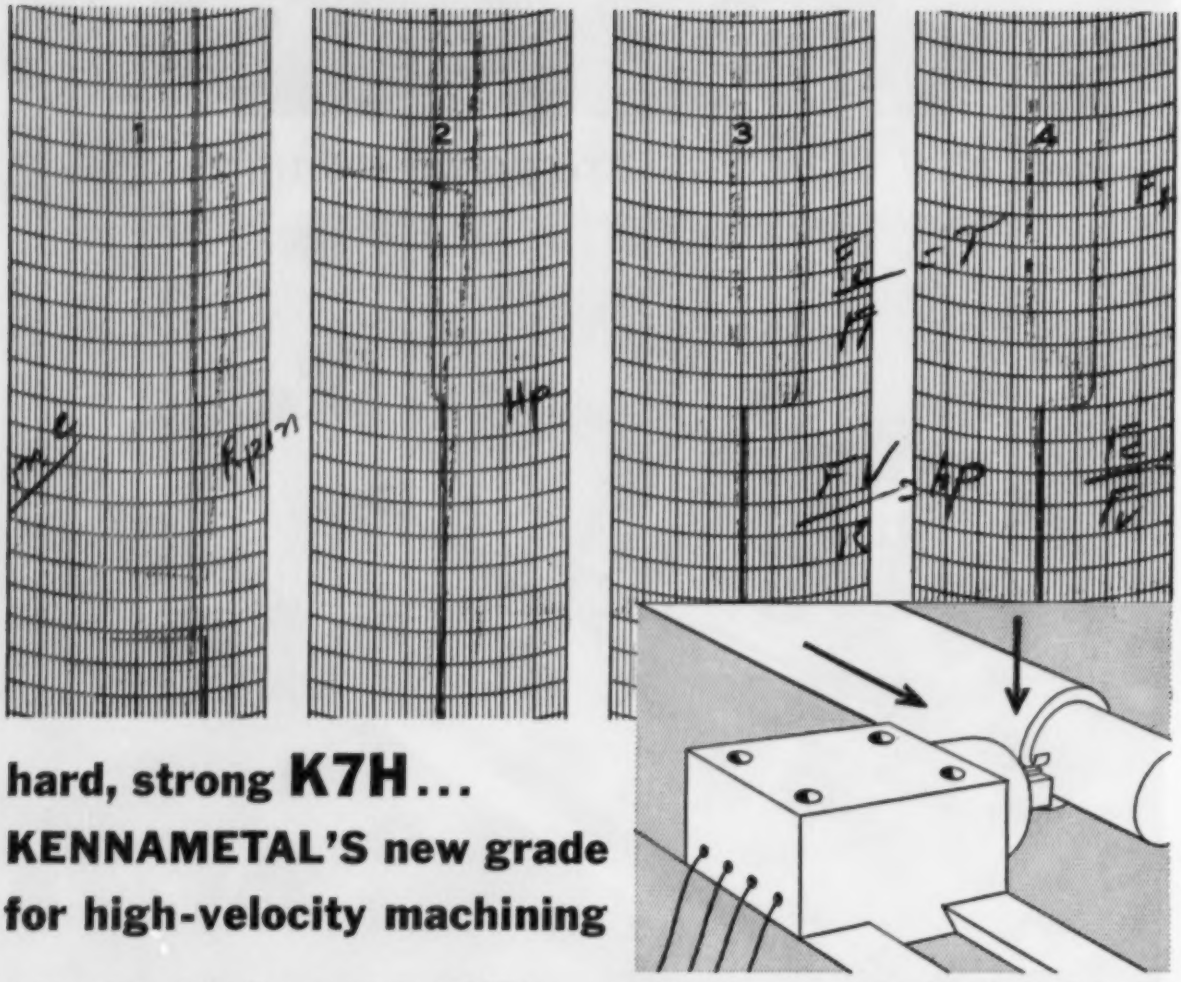
See what adhesives can do for you . . .

Call upon 3M research for the solution to your specific design or production problem. Call an expert, your nearest 3M Field Engineer—or write for further information to 3M, Dept. 305, 417 Piquette, Detroit 2, Mich.

ADHESIVES AND COATINGS DIVISION **MINNESOTA MINING AND MANUFACTURING COMPANY**

417 PIQUETTE AVE., DETROIT 2, MICH. • GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 99 PARK AVE., N.Y. 16, N.Y. • CANADA: P.O. BOX 757, LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE ADHESIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS



hard, strong K7H... KENNAMETAL'S new grade for high-velocity machining

In lab and shop tests, Kennametal* Grade K7H has proved to be a real "work horse" for high-velocity machining.

It's a genuine carbide—the hardest ever offered by Kennametal (93.5 Rockwell A).

It's strong—two to three times the strength of non metallic cutting materials . . . strength to resist chipping and cratering . . . strength to trace and cut to a shoulder . . . strength to stand up to normal shop abuse without "babying."

It's versatile . . . has the stamina to cover the range of feeds and depths of cuts for modern high-velocity finishing of steel alloys and the new hard-to-cut materials. Grade K7H even takes casting "skin" and forging scale in stride on light cutting—another indication of its strength and stamina.

In the Lab—with tool post dynamometer:

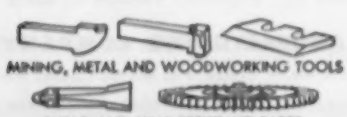
Compared with other carbides at high velocity, Grade K7H showed these results: *Test No. 1* (without coolant)—K7H performance, cutting 29-32 Rockwell C steel, indicated 27 times longer life; *Test No. 2* (with coolant)—K7H showed 28 to 1 better performance (also on 29-32 Rockwell C materials) than the control carbide grade; *Test No. 3* (without coolant)—cutting 37-39 Rockwell C steel, Grade K7H showed considerably higher resistance to wear than other carbides.

In the Shop—production runs:

Compared with non metallics, and long-established carbides on high-velocity finish machining of SAE 5135 170-207 Bhn., Grade K7H averaged 1000 gears per cutting edge while other carbides produced only 350 pieces, and ceramics broke down at 400-450 per edge.

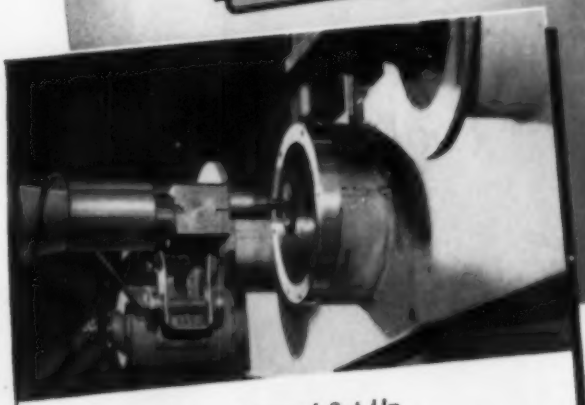
These tests show that Kennametal Grade K7H is truly the "work horse" for high-velocity machining as we know it today. Why not ask a Kennametal tool engineer to demonstrate Grade K7H in your operations. Or write for complete information. Address KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered trademark



INDUSTRY AND KENNAMETAL ...Partners in Progress

The INSIDE STORY of INTERNAL GRINDING by NORTON



An Unusual Set-Up

Grinding bearing housings with a Norton wheel on a Dumore tool post grinder, mounted on a horizontal boring mill. The grinder itself revolves in a planetary motion, the grinding wheel spindle following the I.D. of the hole. To grind the other end of the housing the work table is turned 180°. *Material:* cast steel. *I.D.:* 7.8737". *Stock removal:* .005" each end. *Limits:* +.0001", —.0004". *Time:* two hours each end.

Precision Performance — Doubled

Here a Norton two-wheel set-up is ready to go into fast grinding action. The job is grinding a double race in a steering gear bearing. *Material:* SAE 1045 steel, 54 Rockwell C. *I.D.:* 1.1507". *Stock removal:* .012". *Limits:* +.0000", —.0005". *Finish:* 10 microinches RMS. *Time:* 60 seconds.

How Norton wheels add the "TOUCH of GOLD"

Norton wheels for internal grinding are precision-processed to give them completely uniform structure and identical top performance. There's no fussing with timing cycles when you change wheels. They're extra fast and cool-cutting, extra long lasting — built in sizes and types, bonds and abrasives, to bring the profit-boosting "Touch of Gold" to every internal grinding job.

Ask your Norton Distributor about the G Bond and 32 ALUNDUM* abrasive — the ideal combination for many precision and semi-precision grinding jobs. Or write direct to your nearest Norton district office. NORTON COMPANY, Worcester 6, Mass. Offices in nine cities. Distributors in all industrial areas. Behr-Manning, Troy, N. Y., division of Norton Co. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

Rounding It Out — Fast

During hardening, a certain amount of warpage occurs in this steel mould band. A Norton wheel is grinding it perfectly round and smooth. The band has an I.D. of 6" and is 4" deep. Average amount of stock removal is .040" and the time cycle is 30 minutes.

W-1685

NORTON

ABRASIVES

Making better products...to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

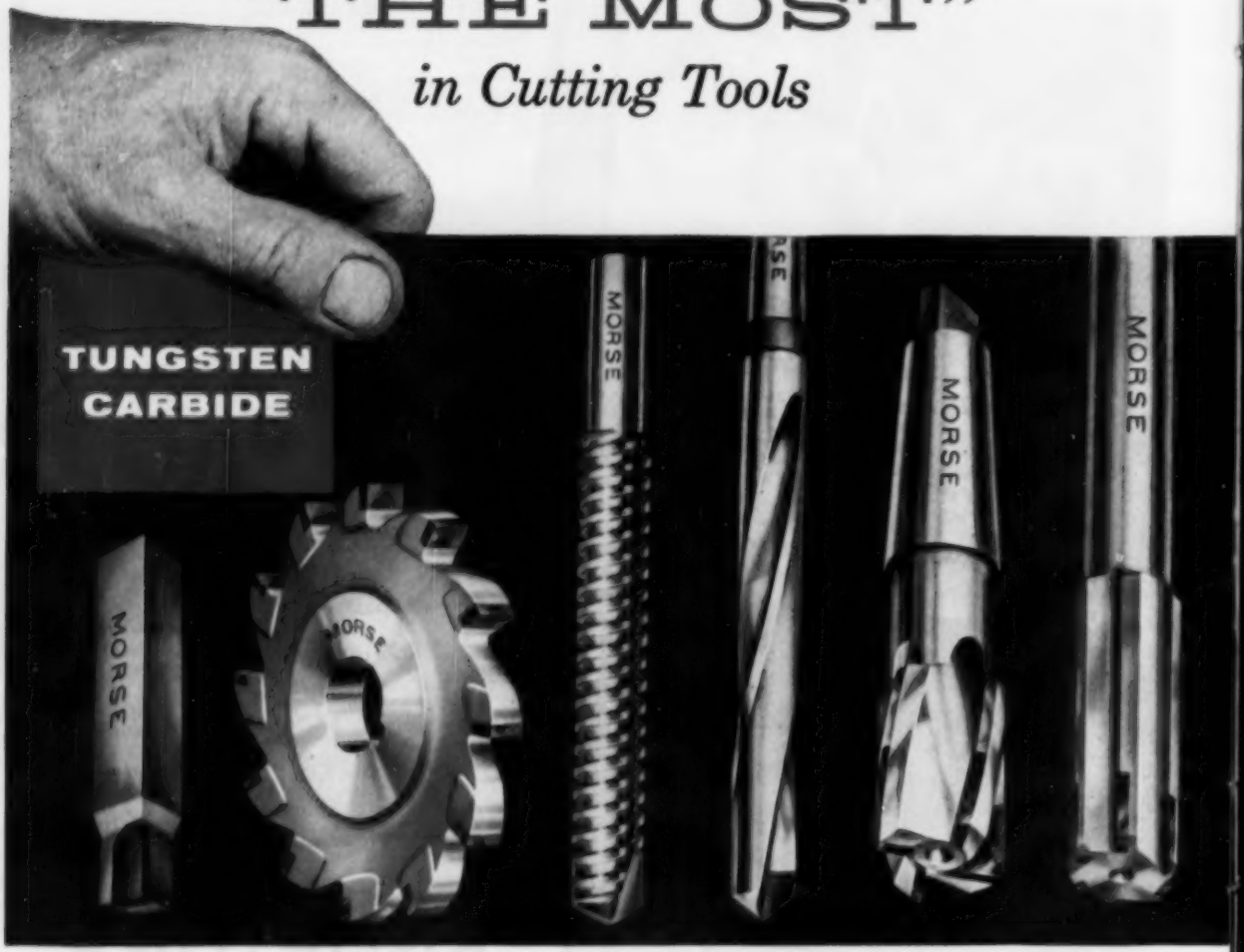
Here's why . . .
more than ever . . .

MORSE

means

"THE MOST"

in Cutting Tools



. . . plus MORSE *Electrolized* Tools

On jobs where there's excessive wear and abrasion, Morse Drills, Taps, Reamers, Cutters and End Mills last 2 to 10 times longer than untreated tools. Available only from your Morse-Franchised Distributor.

. . . plus MORSE *"Vectormatic-Ground" Taps*

New, exclusive Morse "Vectormatic" process gives you taps with "locked-in precision" . . . with tolerances held nearly 300% closer than with old thread-grinding methods. Available only from your Morse-Franchised Distributor.

Now Morse gives you everything from carbon to carbide . . . the most complete cutting tool line in industry today. *And the one man who has this complete line is your Morse-Franchised Distributor.*

This means that all your needs can be covered by one order . . . one invoice . . . backed up by Morse engineering service. And it also means that your Morse-Franchised Distributor can freely recommend the best cutting tool for every job in your plant . . . *regardless of tool requirement.* So see him *now* for all the cutting tools you need, including the new Morse Tungsten Carbide line, tipped or solid.

MORSE TWIST DRILL & MACHINE COMPANY • NEW BEDFORD, MASSACHUSETTS

(Division of VAN NORMAN CO.) Warehouses in New York, Chicago, Detroit, Dallas, San Francisco

MORSE

CUTTING TOOLS

Buy them by phone from your Morse-Franchised Distributor and save ordering time

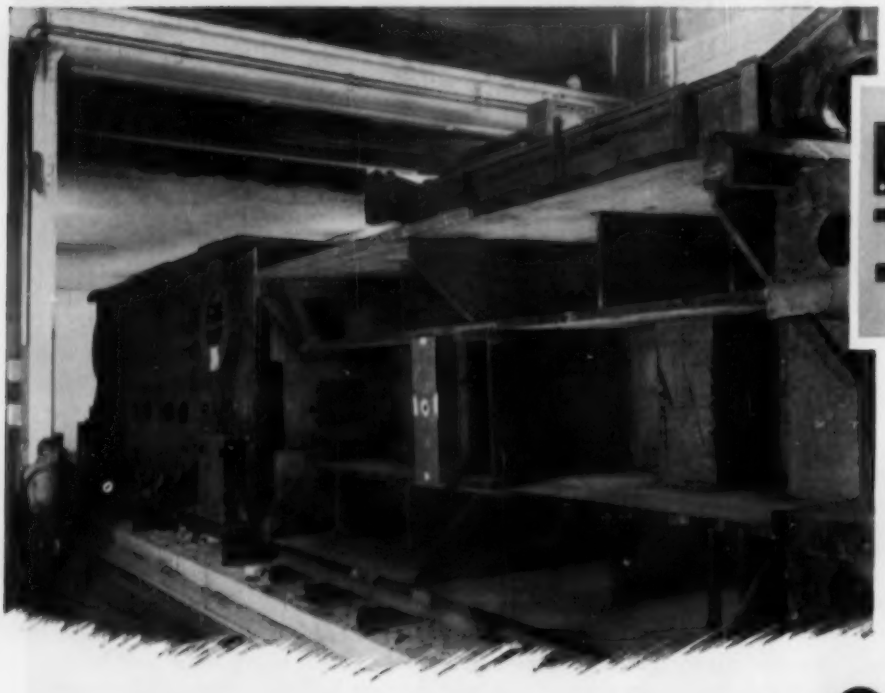
How Morgan stress relieving insures maximum design strength

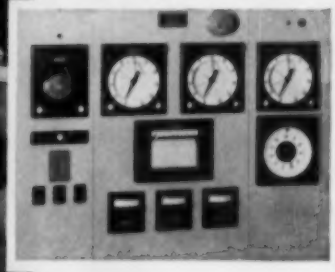
• STRESS RELIEVING is one of many reasons why Morgan cranes provide longer, completely safe service under *any* operating conditions. Trolley frames, end carriages, trucks, drums, bearing caps, stripper barrels and rams, pit rams . . . all are stress relieved in Morgan's huge furnace capable of handling loads up to 250,000 pounds.

Morgan's stress relief furnace, one of the largest in the world, can raise temperatures 200 degrees Fahrenheit per hour up to 1750° F.

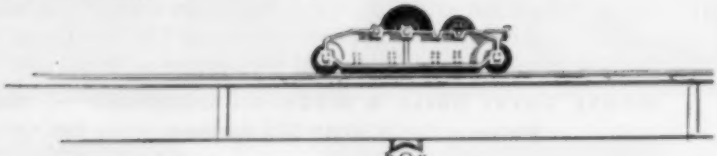
Stress relieving is still another example of the advanced design and construction features that make Morgan cranes the best in the business.

Performance records prove that Morgan cranes cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!





• Stresses built up in welding process are relieved in this 52 x 20 x 15 foot furnace. The 48 dual fuel burners are divided into three temperature zones, each zone controlled by an electronic potentiometer. Safety devices include high limit temperature controls, fuel shut-off valves. Combustion safeguards insure against over-heating.



THE

MORGAN

ENGINEERING CO. *Alliance, Ohio*

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

CALENDAR
OF MEETINGS

May 13-16, Copper & Brass Research Association: Annual meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Manager: Theodore E. Veitfort.

May 14-15, National Association of Sheet Metal Distributors: Spring meeting, Roosevelt hotel, Pittsburgh. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Ferniey Jr.

May 14-16, National Industrial Service Association: Annual meeting and exhibit, Bellevue-Stratford hotel, Philadelphia. Association's address: 818 Olive St., St. Louis 1, Mo. Executive secretary: Fred Wipperman.

May 14-17, Design Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

May 16-18, Anti-Friction Bearing Manufacturers Association Inc.: Annual meeting, Princeton Inn, Princeton, N. J. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: H. O. Smith.

May 16-18, Society for Experimental Stress Analysis: Spring meeting, William Penn hotel, Pittsburgh. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

May 17-18, National Industrial Conference Board Inc.: Annual meeting and general session for all associates, Waldorf-Astoria, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

May 17-18, Society for Advancement of Management: Material handling conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold R. Bixler.

May 20-22, Building Research Institute: Annual meeting, Sheraton-Brock hotel, Niagara Falls, Ont. Institute's address: 2101 Constitution Ave., Washington 25, D. C.

May 20-23, Industrial Heating Equipment Association: Spring meeting, Homestead, Hot Springs, Va. Association's address: Association's Bldg., Washington, D. C. Executive vice president: Carl L. Ipsen.

May 20-23, National Association of Purchasing Agents: Annual convention and show, Hotel Cleveland, Cleveland. Association's address: 11 Park Place, New York 7, N. Y. Executive secretary-treasurer: G. A. Renard.

May 20-23, National Industrial Advertisers Association: Annual meeting, Palmer House, Chicago. Association's address: 271 Madison Ave., New York 16, N. Y. President: John C. Freeman.

May 20-24, Air Pollution Control Association: Annual meeting, Hotel Statler, Buffalo. Association's address: 4400 Fifth Ave., Pittsburgh 13, Pa. Executive secretary: Harry C. Ballman.

May 21-23, Triple Industrial Supply Convention: Traymore hotel and Chalfonte-Haddon Hall, Atlantic City, N. J. Information: W. B. Thomas, Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

May 23-24, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria, New York. Institute's address: 350 Fifth Ave., New York 1, N. Y. Secretary: George S. Rose.

May 23-24, American Management Association: General management conference, Hotel Roosevelt, New York. Association's address: 1515 Broadway, New York 36, N. Y. Vice president-secretary: James O. Rice.

May 28-30, Wire Reinforcement Institute Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1049 National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

May 28-June 2, Concrete Reinforcing Steel Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delzell.

May 28-31, National Fluid Power Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

PARTS LAST LONGER ... if they're centrifugally cast by the Shenango process. Tougher parts because of finer, pressure-dense grain, greater strength, better elongation and freedom from sand inclusions and blow holes. There's minimum waste, less machining. The large bronze liner and seat ring shown here are typical of various parts, large and small, ferrous and non-ferrous, regularly produced in Shenango's modern plant. Informative bulletins give all the facts. Write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio.
How SHENANGO CENTRIFUGAL CASTINGS pay off!
SHENANGO
CENTRIFUGAL CASTINGS
COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

[Advertisement]

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Metallic bright, iridescent yellow-red, brown.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases, sizeable savings in the cost of buffing and electroplating are realized.

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

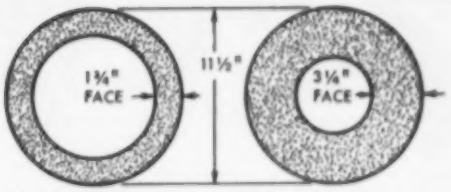
In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least $15,000 a year on maintenance of racks alone and another $40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.

Production per wheel up 36%



FORMER WHEEL
47,405 PIECES

GARDNER WHEEL
65,050 PIECES

use of wider face increases production—cuts abrasive costs.

There may be a similar opportunity in your shop to cut abrasive costs. A request gets an analysis of your job.

GARDNER

abrasive discs

BELOIT, WISCONSIN

60 second tour

shows it in a nutshell . . .

All-Inclusive Spring Service

COMPRESSION SPRINGS
Regular, Double

COMPRESSION SPRINGS
Special Shapes
Variable pitch

VOLUTE SPRINGS
Coned end

EXTENSION SPRINGS
Special Hooks
and Loops

EXTENSION SPRINGS
Swivel End
Drawbar

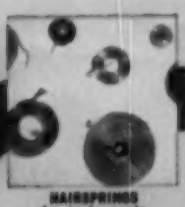
TORSION SPRINGS
Single, double
Edge wound

POWER SPRINGS
Clock or Motor

FLAT SPRINGS
Arched, Curved-beam
Elliptical

CLIPS, CLAMPS
and COLLARS

FASTENERS and
RETAINERS



HAIRSPRINGS
for instruments
Gauges, etc.

SPRING WASHERS
Wavy, Star, Finger,
Expander, etc.

BELLEVILLE SPRINGS
In Series, Parallel
Parallel-series

DIAPHRAGMS
Discs, Plates

PLUS
COLD-ROLLED
SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

THE WILLIAM D. GIBSON COMPANY
1640 OUTWARD AVE.
CHICAGO 14

RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA

BARNES-GIBSON-RAYMOND
40300 PLYMOUTH RD.
PLYMOUTH, MICH.

B-G-R COOK PLANT
ANN ARBOR
MICHIGAN

DIVISIONS OF ASSOCIATED SPRING CORPORATION
COAST TO COAST

SEABOARD Coil Spring Div.
1900 S. BROADWAY
GARDENA, CALIF.

OHIO DIVISION
1605 EAST FIRST ST.
DAYTON, OHIO

WALLACE BARNES COMPANY
STATE FAIR BLVD.
SYRACUSE 9, SYRACUSE

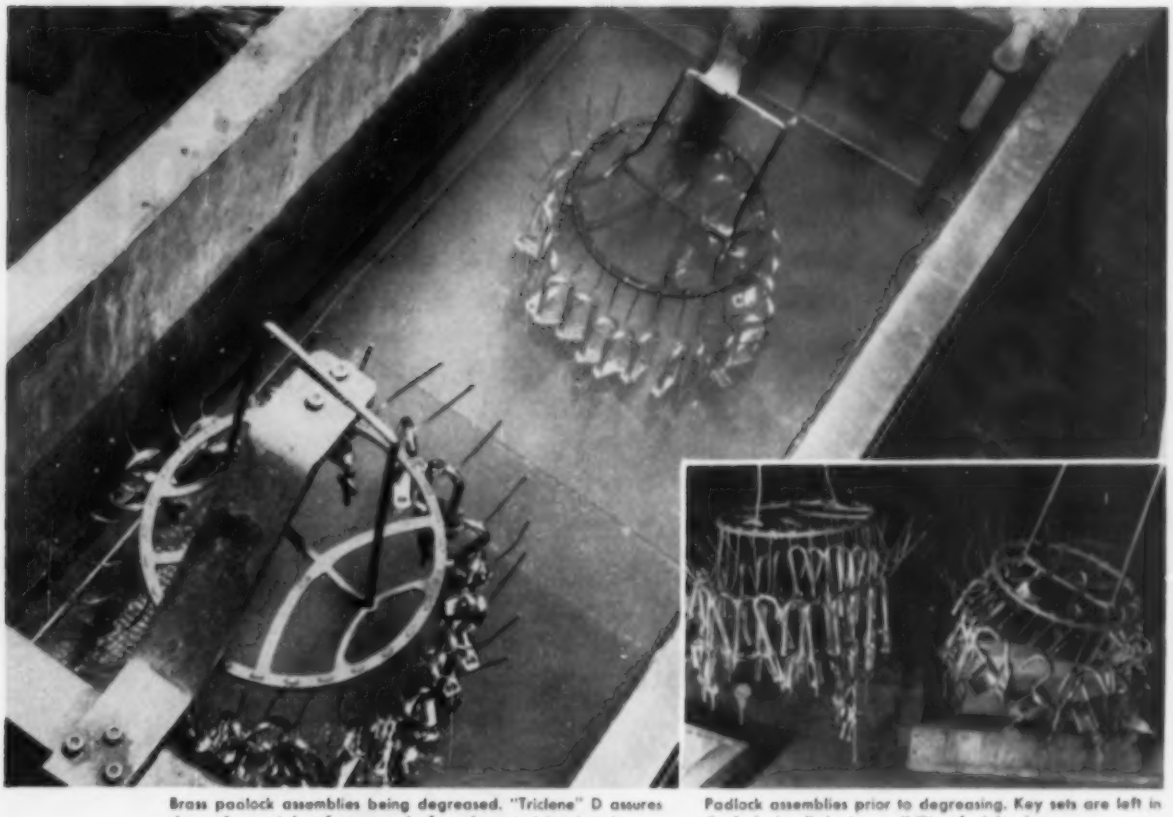
MILWAUKEE DIVISION
341 E. ERIE ST.
MILWAUKEE, WIS.

DUNBAR BROTHERS COMPANY
BRISTOL, CONN.

F. N. MANROSS AND SONS CO.
BRISTOL
CONNECTICUT

THE WALLACE BARNES CO., LTD.
HAMILTON
CANADA

Divisions of
ASSOCIATED SPRING CORPORATION



Brass padlock assemblies being degreased. "Triclene" D assures clean, dry, metal surfaces, ready for subsequent treatments.

Padlock assemblies prior to degreasing. Key sets are left in the locks to eliminate possibility of mixing keys.

American Hardware Reports:

"50 to 75% longer time between degreaser cleanouts ... brighter cleaning ... with TRICLENE® D"

In April 1955, the P. & F. Corbin and Russell & Erwin Divisions of the American Hardware Corp., New Britain, Conn., began using "Triclene" D trichlorethylene exclusively in their six conveyorized and three manual degreasers. Their builders' hardware line includes locks and door fittings with highly polished surfaces of brass, bronze, copper, steel and zinc.

Since they started using "Triclene" D, they report: "...brighter cleaning...no necessity to wipe parts before lacquering." They also noted a steadier pH and solvent went 50 to 75% longer before a cleanout was needed. Moreover, "the coils are easier to clean."

Heat, light, air, acids and aluminum chloride will not affect "Triclene" D with locked-in stabilizers. This rugged solvent safely cleans even the most delicate metal surfaces. "Triclene" D retains its original purity longer ... gives bright cleaning of any metal, distillation after distillation. Yet it costs no more than ordinary solvents!

Get all the facts on Vapor Degreasing in this new Du Pont book. Forty-two pages of data, figures and illustrations cover all the latest developments. For a copy—without obligation—mail the coupon below.

TRICLENE® D
TRICHLORETHYLENE
DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department S-5
Wilmington 98, Delaware

☐ Please send me a copy of your new Vapor Degreasing book.
☐ Please have your Representative phone for an appointment.

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____

LINK-BELT PRE-BILT

MADE NEAR YOU

Built in standard sections for 18, 24, 30 and 36-in. belt widths... at each of 9 plants

AN unmatched combination of belt conveyor efficiency and economy, Link-Belt PRE-BILT sectional belt conveyors incorporate standard products packaged with standardized sectional truss frames and structural steel supporting bents. They're easy to install . . . require little or no special engineering on most jobs. And their portability plus easy extension are important aids to flexibility.

PRE-BILT conveyors are manufactured at a Link-Belt plant in your own area to assure prompt delivery. There are also Link-Belt sales offices located throughout the country . . . equipped to give you prompt, efficient service for all your belt conveyor requirements.

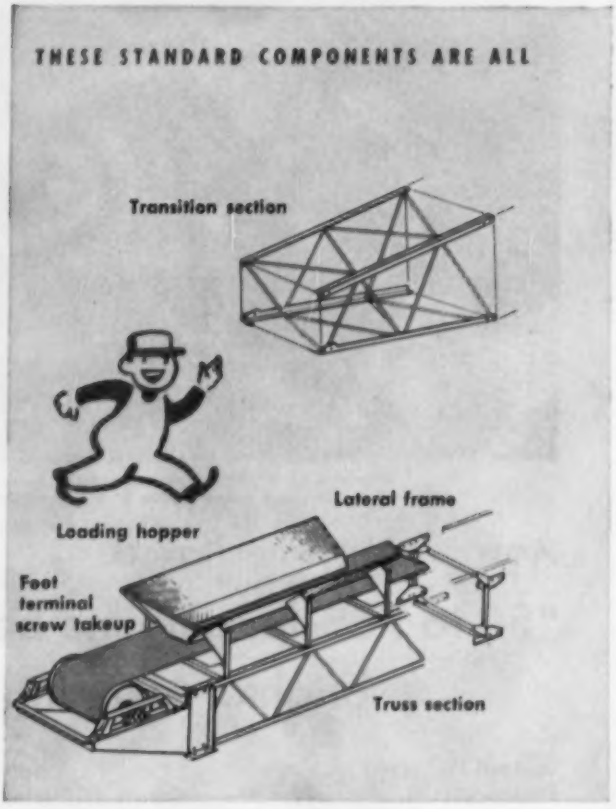
For more information about these conveyors—with drives up to 40 hp and 24 and 42-inch truss depths, write for your copy of Book No. 2579.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

LB.572



AS SIMPLE AS THIS FROM SELECTION TO OPERATION —

EASY SELECTION
Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

PROMPT QUOTATIONS
He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

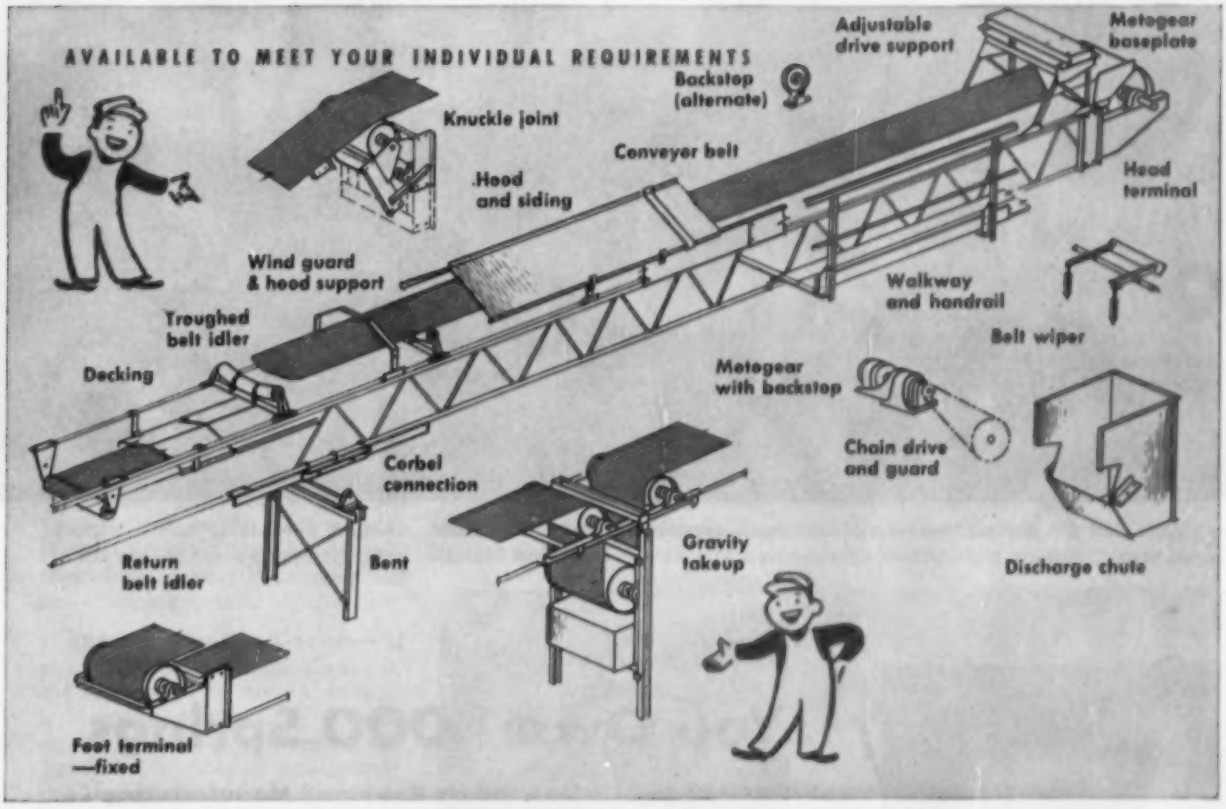
SIMPLIFIED PURCHASE
Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all necessary data.

QUICK DELIVERY
PRE-BILT conveyors are built at nine strategic locations and are shipped from the plant nearest you.

FAST INSTALLATION
Can be readily handled by your own erectors in most cases—due to simple construction and shop-assembled components. Link-Belt can also furnish complete erection service and supervision.

Sectional Belt Conveyors

FOR FAST DELIVERY



PRE-BILT reclaim belt conveyor delivers material from tunnel under stockpile to hopper. System of nine belt conveyors and two radial stackers handles up to 6000 tons per day.

PRE-BILT conveyors can be easily extended to follow mining or disposal operations, as in this system providing low-cost disposal for 1140 long tons per hour of overburden and lean ore.

Walter Casler, left foreground, foreman of automatic production, and Les Danner, assistant purchasing agent, inspect Pittsburgh Steel Company high-carbon, oil-tempered MB wire at Raymond Manufacturing Company plant at Corry, Pa.

Peter Dubrosky, assistant to chief inspector at Raymond Manufacturing Co., Corry, Pa., plant, measures extension of a Westinghouse Laundromat tub spring during a quality control inspection.

You Own 1,000 Springs

Pittsburgh steel wire used by Raymond Manufacturing Co. in long-lasting Westinghouse Laundromat® Springs

One thousand springs of all sizes, shapes and functions are the property of the average home owner. And if the family car is included, the figure would be over 1,600.

Count the many springs in one popular model refrigerator. Add the tiny springs that control thermostats in electric or gas ranges. Throw in the three rugged springs that suspend the automatic washer's tub (if it's a Westinghouse Laundromat®).

Springs serve every day in dozens of ways—silently, surely and safely. Making them is a job requiring top-flight design, best quality materials, the latest coiling machines, plenty of experience and know-how.

A case in point—take one of the nation's oldest and largest spring makers, Raymond Manufacturing Company, a division of Associated Spring Corporation.

• **Three Vital Springs**—Raymond helped develop and now makes three vital springs which support the tub unit in Westinghouse Electric Corporation's Laundromat. A major supplier of the .207 oil-tempered MB wire from which the springs are coiled are Pittsburgh Steel's wire mills in Monessen, Pa.

Raymond meets Westinghouse's rigid specifications precisely. And Raymond officials give Pittsburgh wire credit for a strong assist.

Les Danner, Raymond's assistant purchasing agent who buys 2,200

(Advertisement)

sizes and types of materials at Corry, Pa. says:

"I'm fully sold on the quality of Pittsburgh Steel's wire. Pittsburgh Steel has become a major supplier for us because its quality is tops."

Walter Casler, foreman in the automatic production department, has 26 years of experience behind him when he says:

• **"Best I've Ever Seen"**—"I don't ever recall a rejection of Pittsburgh Steel's wire for quality. Pittsburgh's oil-tempered, especially, is some of the best wire I've ever seen."

Raymond must depend on the quality of the wire when making the Laundromat springs. These springs are coiled extension springs, tapered at one end to a bell shape. Two of the three springs on each tub are 6⅜ inches long, 2½ inches O.D., and weigh one pound, seven ounces each. The third spring is smaller.

The two larger springs must be capable of supporting 52 pounds at 9½" extension. At 11⅞ inches, they must carry 78 pounds. Because the three springs are the main support of the tub unit in the Laundromat, they must be both load-supporting and vibrating springs.

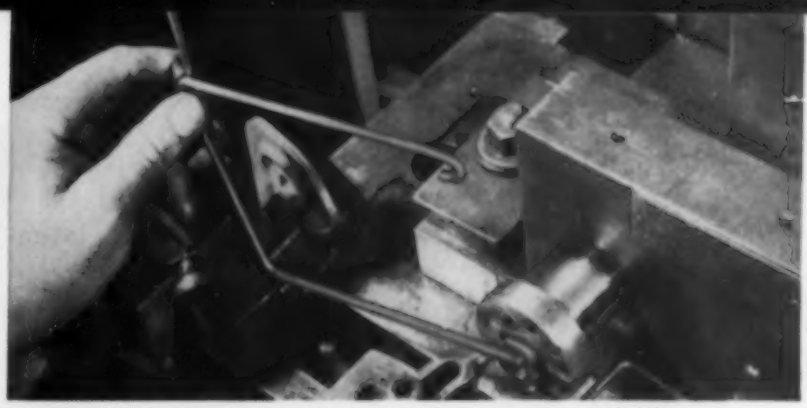
• **Surface Quality Counts**—If any of the three springs falls in use, the cost would be the expense of a complete dismantling to make repairs. That's why Raymond has installed a number of quality control inspections and tests throughout the production process.

Pittsburgh Steel also is Raymond's major supplier of hard-drawn, high-carbon MB wire. Pittsburgh Steel ships to Raymond tons of basic, bright, low carbon wire as well.

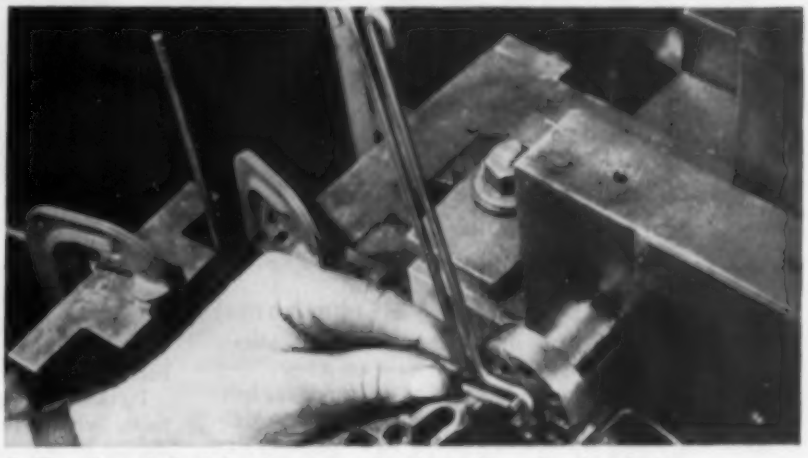
Raymond's experience with Pittsburgh Steel wire has been duplicated in many other plants across the nation.

Pittsburgh Steel's range of wire products can fit quickly, profitably into your operations. Its 50 years of experience in quality wire-making, its willingness to give service, its own extensive facilities and those of its subsidiary, Johnson Steel & Wire Company, can be the answer to your wire problem.

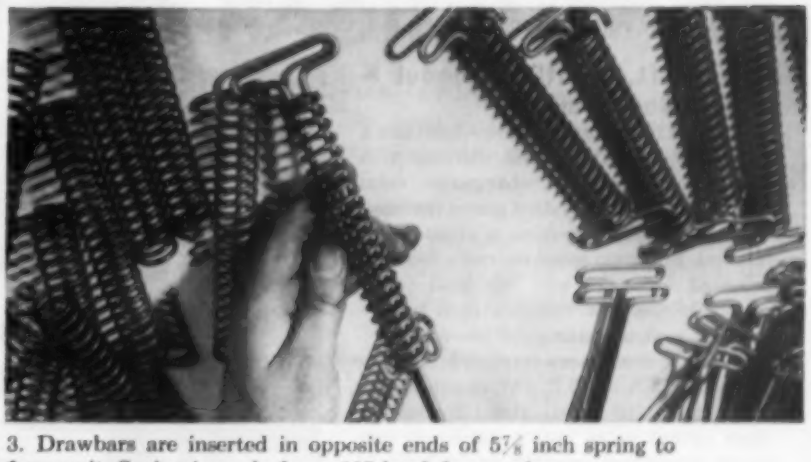
There's a national sales staff at your disposal. Contact any member of it today.



1. An 18⅛ inch piece of Pittsburgh Steel Company's .162 bright low carbon basic wire is hook wound on either end before being formed into a drawbar for extension spring on boat trailer.



2. Fourth and final forming operation in making drawbar is to form the loop.



3. Drawbars are inserted in opposite ends of 5⅞ inch spring to form unit. Spring is made from .105 hard drawn wire.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

(Advertisement)

what's new in GIANTS?

This 8¾" SCHIESS model BF horizontal boring and milling machine . . . Now completely redesigned with many innovations. Here are a few . . .

Two individual drives—gear-drive for roughing, belt-drive for finishing. Belt-drive particularly suited to high-speed machining with carbide tools. New tool clamping device—does away with draw keys, hammers, drifts and binding screws. All spindle-slide movements controlled from easily accessible operating platform (or from pendant station or portable control panel, if desired). Special main-drive belt requires no readjusting. Column, spindle-slide and boring spindle may be adjusted at rapid traverse.

Spindle diameters, 6¼" to 8¾". Maximum diameter bored, 59"—faced, 79".

It takes Europe's largest builder of heavy machine tools, Schiess, to turn out giants like these. Parts and service as close as Pittsburgh. And an American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all Schiess BF and K models.

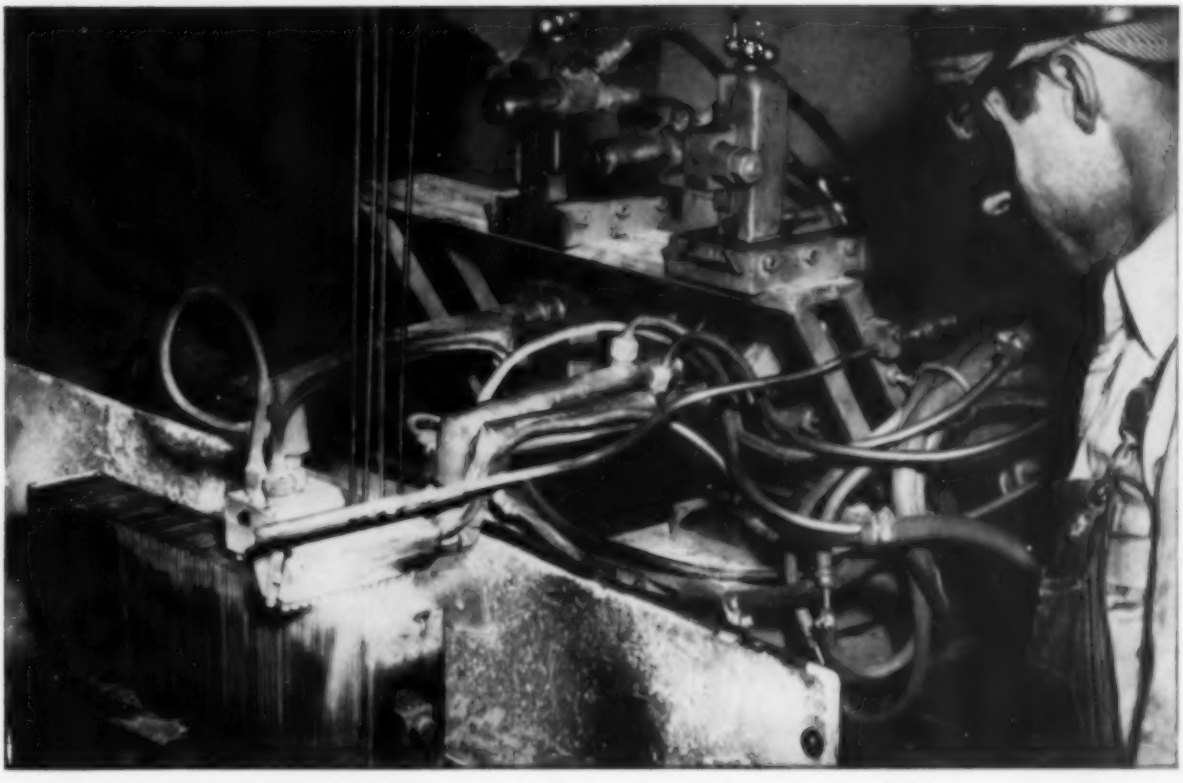
This 23 ft. SCHIESS model K vertical boring mill . . .

Look at all these new features—each one a time-saver! Rapid traverse motions with pushbutton control of changeover from feed motion to independent power traverse. Electro-mechanical locking of cross-rail to columns. Fingertip speed control—counter-balanced cross-rail and side-head—completely enclosed swiveling octagon rams—pendant control—automatic lubrication.

Turning diameters in standard sizes range from 8 ft. to 23 ft. (which can handle stock up to 100 tons!). Basic Schiess designs permit extra heavy machines, normally considered specials, to be built to your work diameter and load requirements. Even a diameter of 84 ft.!

Engineering Division
AMERICAN SCHIESS CORPORATION
1232 Penn Avenue, Pittsburgh 22, Pennsylvania

Sole Distributor
KO KURT ORBAN COMPANY, INC.
34 Exchange Place, Jersey City, N. J.



Hammer Life Increased Four Times by HARD-FACING

Hard-facing with HAYSTELLITE tube rod has increased the life of hammers used in a heavy duty grinder by four times. The hammers rotate at from 3000 to 3600 revolutions per minute while pulverizing metal turnings, limestone, glass, mica, and other severe abrasives. They are hard-faced mechanically on a model 800 straight-line machine. 70 hammers are processed at a time, and 1000 hammers are hard-faced in a normal working day.

HAYSTELLITE rod, the hard-facing material used on the hammers, forms an extremely hard surface that has good resistance to impact. It produces a deposit consisting of sharp, irregularly shaped particles of cast tungsten carbide evenly distributed in a matrix of tough steel. The tungsten carbide particles resist abrasion, and the steel matrix cushions the effects of sudden shock.

There are 15 HAYNES hard-facing alloys . . . a wide selection that guarantees you the right rod at the right price for every wear problem. The HAYNES Hard-Facing Manual describes these alloys in detail, and outlines recommended procedures for applying them. We shall be happy to send you a copy upon request.

We also design and produce mechanized hard-facing equipment. For a description of the process and available equipment ask for "Mechanized Hard-Facing" Form 8564.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Haystellite" are registered trade-marks of Union Carbide and Carbon Corporation.

GENERAL ELECTRIC ANNOUNCES . . .
NEW Industrial
GENERAL ELECTRIC

Direct-current Motor

KINAMATIC* a new standard in direct-current motors, gives your machines wider speed ranges, greater output

To meet modern industrial needs for faster, more automatic, more continuous production, General Electric has designed an entirely new direct-current motor—the d-c Kinamatic.

Designed for Automation—Now, a direct-current motor has been designed for the modern job it has to do—either as individual motor drive or in regulating systems. The new General Electric d-c Kinamatic motor supplies the wide speed range and versatility required for today's manufacturing methods. It is designed for the close control of machines and split-second timing of processes essential to higher output.

Accelerated Production—The new d-c Kinamatic motor will modernize your equipment, give it increased power, higher speeds, greater output capacity. With the quick-acting G-E Kinamatic motor, your machines will process a greater variety of products . . . faster . . . easier . . . and with less maintenance and spoilage.

More Powerful—By combining advanced design with improved materials and manufacturing techniques, General Electric engineers have packed more power into the entire Kinamatic line. The powerful Kinamatic motor, with new stamina and durability, is ready to become one of your most effective weapons for keeping costs down, for meeting competition, for boosting productivity levels.

Engineering Help—Industrial specialists in 149 conveniently located General Electric Apparatus Sales Offices have the complete story on how the new d-c Kinamatic motors and generators can benefit your operation. For full details, contact your G-E Sales Representative, or write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 8134

* Trade Mark of the General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

Published in the interest of the Soft Drink Canners Association and the canning industry.

No headaches in these drinks!

Eliminate the hazard of broken bottles in your plant by providing your employees the safety and convenience of canned soft drinks.

Call your soft drink supplier and learn the many advantages of dispensing drinks the modern way—in cans.

QUALITY YOUNGSTOWN SERVICE

Above are illustrated two of the modern cans for soft drinks, now available for in-plant use.

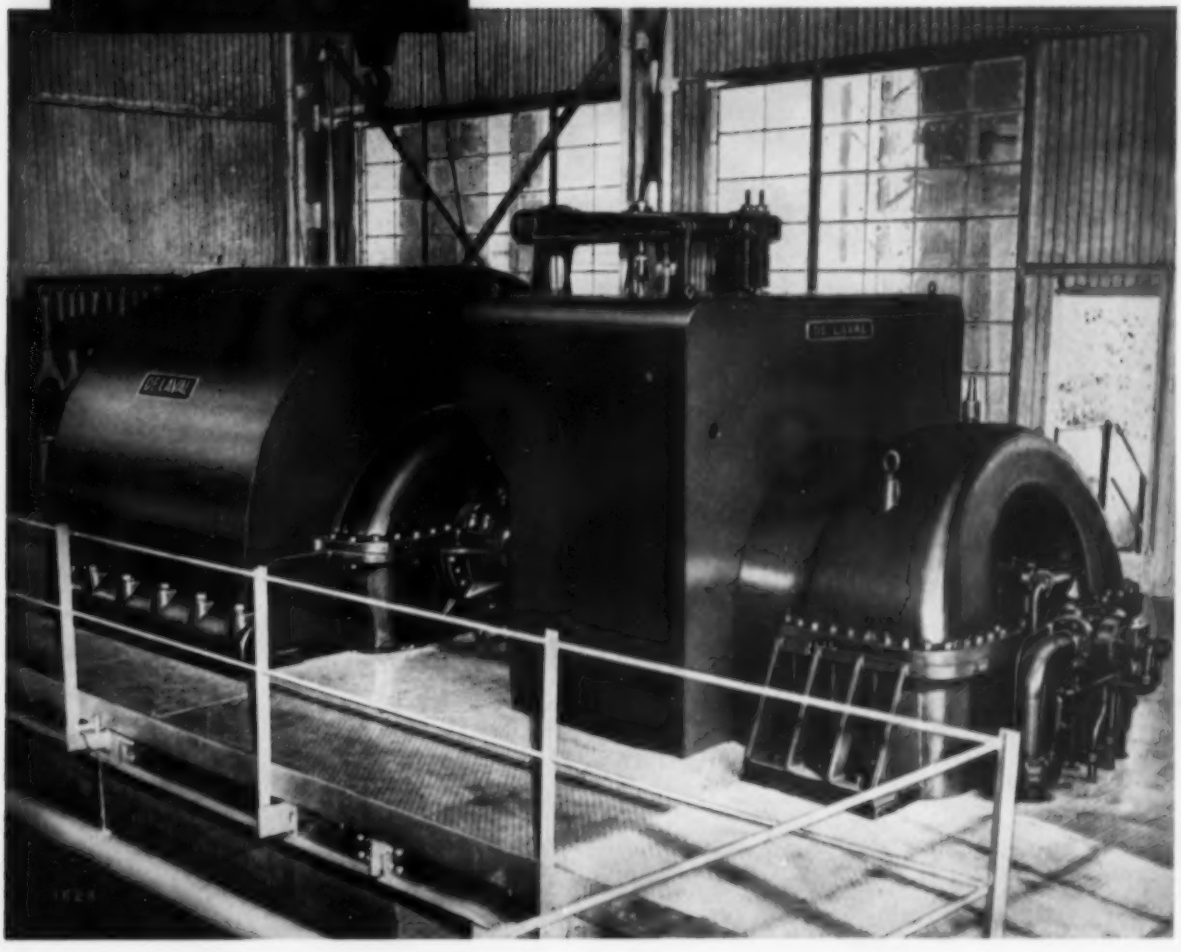
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

DE LAVAL
CENTRIFUGAL BLOWER

delivers 75,000 cfm for southern steel mill



This De Laval 75,000 cfm blast furnace blower in a southern steel mill is driven by a 9,450 hp De Laval turbine operating at 2,900 rpm. Discharge pressure of the blower is 35 psig.

De Laval blowers have what it takes to give long service. The rugged casings and sturdy, perfectly balanced rotors are built to take punishment. The pressure lubricated sleeve bearings and Kingsbury type thrust bearing add durability and reduce maintenance. Both the turbine and blower are De Laval-designed and De Laval-made for top performance.

De Laval centrifugal blowers and compressors are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem. Consult your De Laval Sales Engineer.

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

JL 882

Is your adjustable-speed drive problem different?

. . . then it will pay you to look to Louis Allis for the best solution

There are several reasons why it pays to come to us with your adjustable-speed drive problems.

First of all, we have no axe to grind. We can recommend the proper drive for your needs because we make them all. There's no compromising.

Secondly, when you turn your problem over to us, we tackle the whole job . . . assume the entire responsibility.

And finally, we have more than just drives to offer . . . we have engineering and manufacturing experience. We've already solved a lot of drive problems. That's why we can tell you what you need, no matter what kind of machine you have.

And here are the drives that can do the job for you:

Ajusto-Spede® Drives. 1 to 75 hp. Constant torque with up to 10:1 continuous speed ranges available. Infinitely adjustable eddy current clutch drive.

Select-A-Spede Drives. 1/2 to 400 hp. 8:1 constant torque speed range with magnetic amplifier control. Adjustable speed DC drive motor built in any enclosure.

Electronic and Static Select-A-Spede. 3/4 to 15 HP DC adjustable speed drive motor with speed ranges up to 100:1 and regulation to 1/2%.

See your Louis Allis field engineer or write and tell us about your problems. There's no obligation.

Write for latest informative literature describing the above drives, or contact your nearby Louis Allis Sales Office.

ASD-102

THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

How old are your mills?

See what modernizing with BLISS equipment has done for American Brass' Kenosha Division!

Limit on bar weight raised to 3000 pounds! Before the addition of Bliss entry and delivery equipment, 800-pound bar was the heaviest practical weight that could be put through this single-stand one-way breakdown mill, which reduces the ½-inch copper or brass in a series of passes. The new handling equipment readily coils 3000-pound weights of metal and transfers them gently back to the entry side. Similar Bliss equipment is used with a second single-stand mill, which takes the strip to 0.050-inch gage.

One-way mills converted to reversing! Production of larger coil sizes justified the conversion of one-way mills to reverse rolling operations. Bliss handling equipment has made the work easier and safer for the operating and servicing personnel.

1800 fpm. of new finishing capacity added! This brand new Bliss 5-stand 4-high tandem mill reduces the 0.020-inch strip to gages as thin as 0.004-inch in a single pass. It can deliver 1800 feet per minute of half-width strip. According to the Kenosha Division, it is one of the few 5-stand tandem mills in the brass industry, and the most advanced unit for the finish rolling of metal to exacting specifications for gage. Bliss coil buggy, belt wrapper and tension reel handle coils from 6 to 10 inches wide, up to 27 inches O.D. and 1600-pound maximum weights.

BLISS
SINCE 1857

TO SEE WHAT BLISS CAN DO FOR YOU, WRITE TODAY FOR A FREE COPY OF OUR 60-PAGE ROLLING MILL BROCHURE, BULLETIN 40-A.

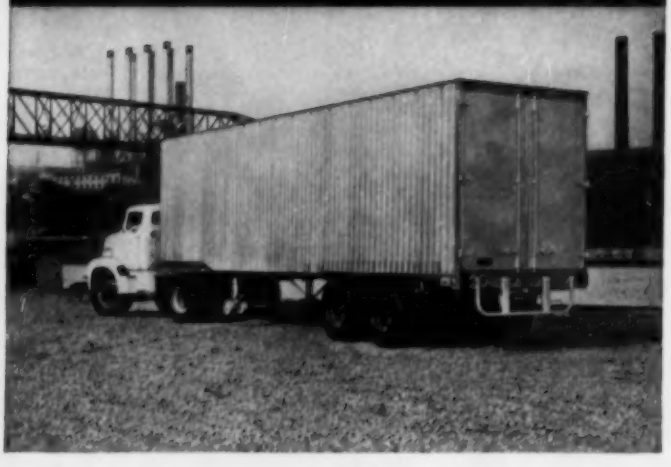
BLISS is more than a name . . . it's a guarantee

E. W. BLISS COMPANY • General Office: Canton, Ohio • ROLLING MILL DIVISION: SALEM, OHIO

You can draw and form them LITTLE

. . . . . .

or fabricate them BIG



with the new A-L low-nickel STAINLESS GRADES

WRITE FOR THE ASSISTANCE YOU NEED

1. "TECHNICAL STUDIES #3"

. . . essential information on the composition, properties, fabricating methods and applications of AL chromium-manganese, low-nickel stainless steels. *Write for your copy.*

2. TEST SAMPLES

. . . We'll be glad to supply on request assistance, and actual samples of these 200-Series steels for testing under your processes and conditions.

ADDRESS DEPT. S-77

In the top photograph, the fabrications you see are a mixing bowl, a tea-kettle base, a lock case and a patented shoe fastener: all made of A-L Type 201 or 202 chrome-manganese low-nickel stainless. The finish is good, the steel handled the same in the presses as Types 301 or 302, and similar drawing, buffing and polishing procedures were followed.

As in the lower illustration, the chrome-manganese low-nickel grades are being used also for fabrications as large as truck trailers and railroad coaches. Again, forming qualities and weldability present no problems, and results are entirely satisfactory.

Sum it all up and this is the answer: you *won't* encounter any particular differences in fabricating the 200-series of stainless steels . . . you *will* find some advantage in price, and a very important factor of much greater availability in times of nickel shortage. ● Why not take advantage of our pioneering experience with the low-nickel grades—let us help you use them. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

WSW 6060

For Stainless Steel in ALL Forms—call

Allegheny Ludlum

AL STAINLESS STEEL

Warehouse stocks carried by all Ryerson Steel plants

PRODUCTION VERSATILITY

ON A GREENLEE 6-SPINDLE AUTOMATIC BAR MACHINE

Greenlee Automatics provide accurate and fast production of an almost endless range of parts. Standardized tooling, wide open tooling area, interchangeable cross-slide cams, built-in threading drive, rapid stroke-setting and other Greenlee advantages provide great versatility, assure a quick and generous return on your equipment investment.

PHONE ROCKFORD, ILLINOIS 3-4881
TO HELP SOLVE YOUR PRODUCTION PROBLEMS

GREENLEE

GREENLEE BROS. & CO.
1925 MASON AVE.
ROCKFORD,
ILLINOIS

BRUSH OFF. Power brushes for polishing, deburring and rough metal finishing use CF&I-Wickwire Brush Wire.

HIGH FASHION FASTENERS. This eye-catching gown has hook and eye fasteners made of CF&I-Wickwire Hook and Eye Wire for secure, inconspicuous closures.

F O R T H O U S A N D S O F U S E S

from dressing up a beautiful lady... to dressing down a metal casting... nothing has so many uses as wire!

NO SHATTERED WINDOWS in this factory. The hex mesh netting for plate glass reinforcement is made of annealed CF&I-Wickwire Glass Netting Wire.

SOLE SUPPORT. Millions of nails—from shoemaker's tacks to heavy spikes—are used annually by scores of industries. Nails are made from CF&I-Wickwire Industrial Quality Basic Wire.

PIN-UP has been a snap for mothers ever since the invention of the safety pin. Today, millions of these indispensable fasteners are made from CF&I-Wickwire Safety Pin Wire.

FOR DRIVING SAFETY. This windshield wiper is operated by dependable, high tensile strength CF&I-Wickwire Cord Wire.

Everybody knows that steel is indispensable to today's manufacturer, today's living . . . yet few people realize that wire is the most widely applicable, the most versatile form in which steel is used. Here's the reason — wire lends itself to thousands of extremely diversified applications. Strength? Wire has it. Ductility? Wire is the first thing you think of. Good looks? Wire can be plated and finished in many attractive ways. On every score, nothing offers so many useful and variable properties as wire.

Whatever you make, process, or assemble, you'll find that CF&I-Wickwire Wire fits into the picture to perfection. We have the experience and the facilities to provide exactly the wires you need from plants conveniently located from coast to coast. Write our nearest sales office for complete details.

3148

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I

MICROHONING*

Generates . . .

ACCURATE, ROUND, STRAIGHT SURFACES

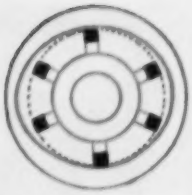
Truly round, straight surfaces are generated by the application of fundamental principles on which the Microhoning process and equipment design are based:

The combined reciprocating and rotating motion of the tool act on the full length of the bore on every stroke.

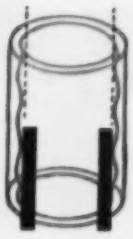
The self-dressing abrasive assures sharp grits and cutting at all times.

The tool and bore automatically align themselves.

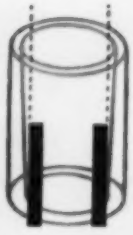
The feed-out of the tool is positive with equal pressure in all directions from the center line.



All out-of-roundness is removed by the expanding abrasive "cylinder" formed by the rotating tool. Only the tight areas are abraded until all areas have the same radius from the axis.



Wavy or snaky surfaces are made straight by the long abrasive sticks shearing off the crests of the waves.



In tapered bores the abrasives cut only in the tight area until the cylinder has the same diameter throughout its full length.

ACTUATING LEVER

Steel Forging • 58 to 60 Rockwell "C"

Bore out-of-round and tapered .0015 to .0025 inch.

Microhoning reduces error to less than .00015 inch

Removing approx. .005 inch stock

Production—130 pieces per hour

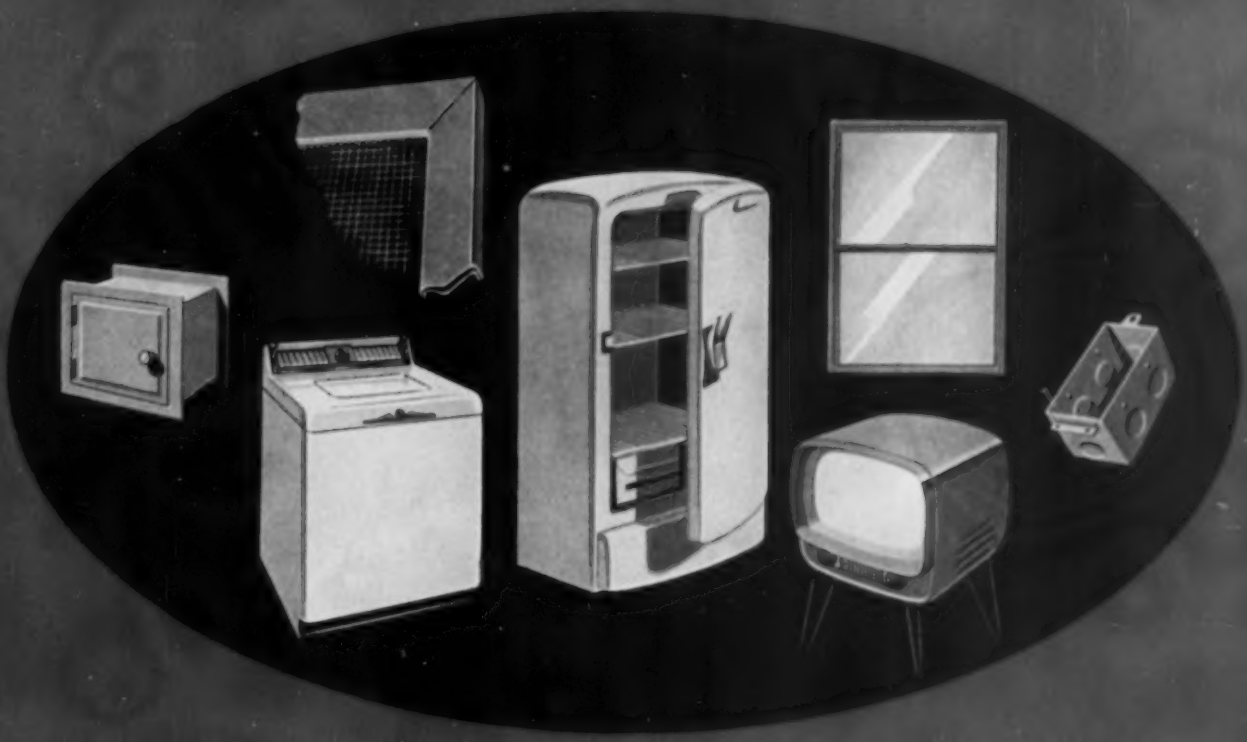
Machine—Model 705-2 Hydrohoner

*MICROHONING = Stock Removal + Geometry + Size Control + Surface Finish

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

In the long run, galvanized steel . . .



In the longer run, WEIRKOTE

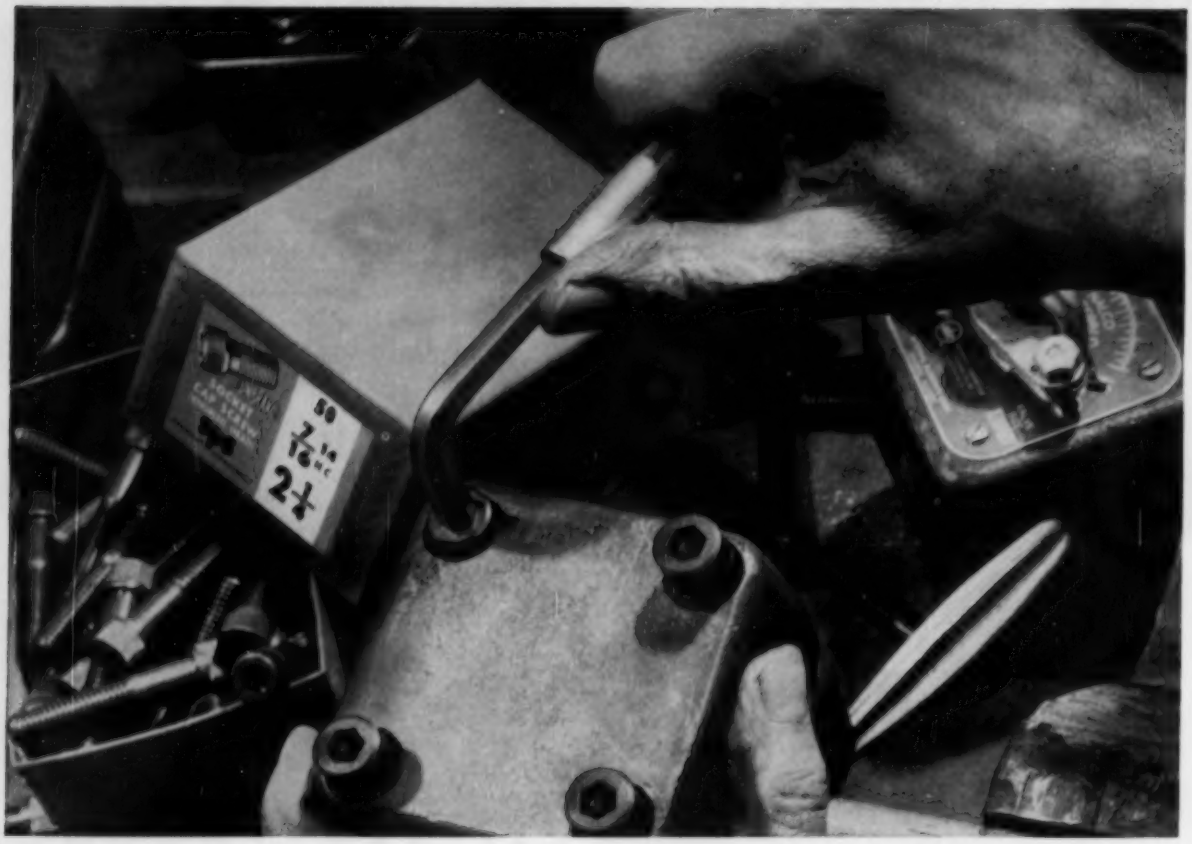
More and more, Weirkote is proving itself to manufacturers of a wide variety of products—under the sternest tests—as a galvanized steel that goes far beyond ordinary galvanized steels.

A special continuous galvanizing process is quality-controlled all the way to make Weirkote withstand the severest stresses of fabrication. Its tightly bonded zinc coat resists cracking, peeling, flaking; resists corrosion for *moisture cannot penetrate to attack the steel underneath.*

And Weirkote's greater strength, rigidity and heat-resistance provide longer life with little or no maintenance.

So for durability, economy, appearance . . . in the *longer* run, Weirkote is your best buy. Put it to work now improving your product . . . *and* your profits!

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

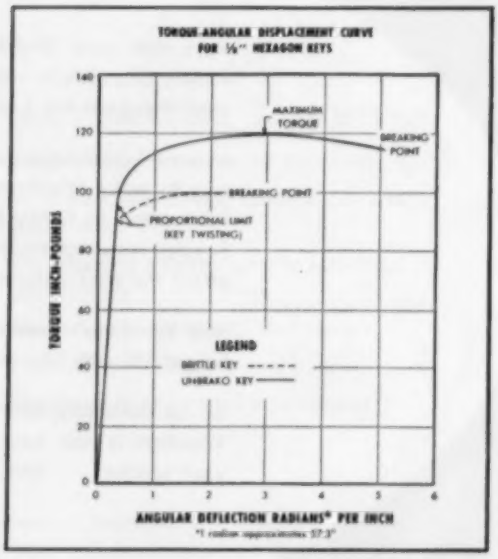


Tighten socket screws tighter, more safely with High-Titan UNBRAKO hex keys

High-Titan UNBRAKO socket screw keys are stronger than ordinary keys. They are made of selected, accurately sized hex stock, with carefully formed 90° bends that won't break. The ends are cut square to engage sockets full depth for highest tightening power. These keys are heat treated uniformly to give hardness and ductility clear through without brittleness or decarburization.

All this results in many advantages. You can torque up a screw tighter with an UNBRAKO than any other key. Performance is consistent—you can apply the same tightening torque every time. Screw sockets won't ream, and the keys won't wear excessively. If you should apply too much torque, a High-Titan would break, but shear off clean and even with the top of the socket—not at the bend—and without leaving jagged exposed edges to gash your hands.

One High-Titan hex key is included with each standard package of UNBRAKO socket screws. High-Titans are also available as sets in convenient, durable plastic key folds, and in bulk. Your authorized industrial distributor carries them in stock. See him today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.



THESE CURVES SHOW THE DIFFERENCE between an UNBRAKO hex key and an ordinary key. The UNBRAKO withstands more tightening torque, twists through 180° without breaking, then shears off even with the top of the screw socket. Ordinary keys snap off suddenly at the bend.

UNBRAKO® SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

HE KEEPS THEM ROLLING—
THE MAN FROM ATLANTIC

The Atlantic specialist in industrial lubrication is a highly skilled expert. He's spent years in the study of every heavy lubricating and cutting-oil problem . . . and he's backed by other Atlantic specialists in lubrication research, production, quality control and marketing.

Atlantic's experience since 1870 has made us familiar with *your* lubricating needs. We've developed the products necessary to do any lubrication job perfectly . . . at the lowest cost . . . for every wheel that turns in industry.

Your company can benefit from our extensive experience and services. For further information on Atlantic's family of products for industrial lubrication and metal processing, write or wire Dept. S5, The Atlantic Refining Company, at the nearest office listed below.

ATLANTIC

LUBRICANTS · WAXES
PROCESS PRODUCTS

PHILADELPHIA, PA.
260 South Broad St.

PROVIDENCE, R. I.
430 Hospital Trust Bldg.

CHARLOTTE, N. C.
1112 South Boulevard

SYRACUSE, N. Y.
Salina and Genesee Sts.

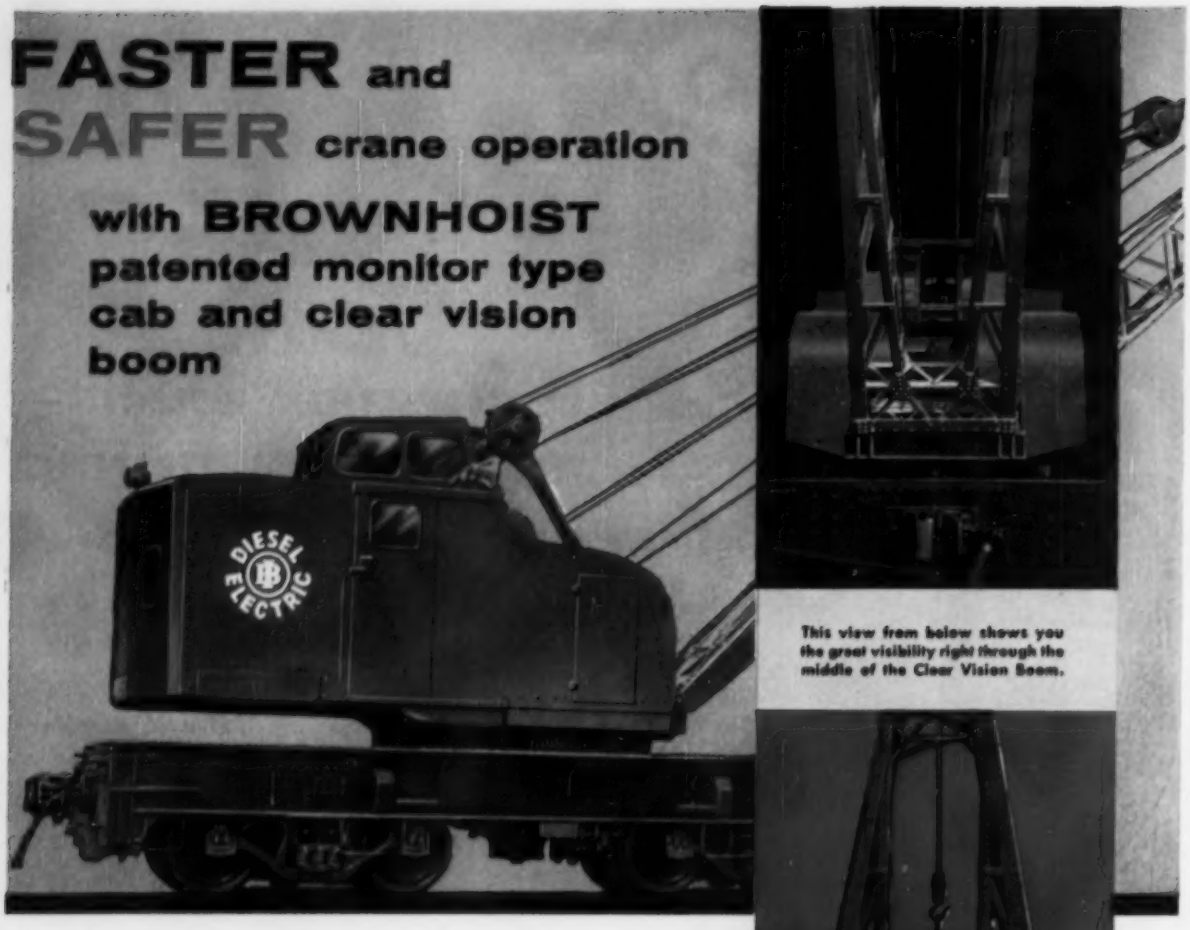
READING, PA.
First and Penn Aves.

PITTSBURGH, PA.
Chamber of Commerce Bldg.

Atlantic Refining Company of Brazil
Edificio Castello
151 Avenida Nilo Pecanha
Rio de Janeiro, Brazil

Porto Rico Oil Company, Inc.
Box 4832, San Juan, Puerto Rico

FASTER and SAFER crane operation with BROWNHOIST patented monitor type cab and clear vision boom



This view from below shows you the great visibility right through the middle of the Clear Vision Boom.

Windows on all sides of the raised Monitor Type Cab of a Brownhoist Locomotive Crane give the operator a full view of the area in which he is working, and the open type Clear Vision Boom lets him look right down at the work itself. This complete 360° visibility—to the sides, to the rear, and forward into the car—allows the operator to work more rapidly, without unnecessary crane swinging, and also increases safety by eliminating blind spots. The patented Monitor Type Cab has a door on each side, and all doors and windows can be opened for ventilation. A soundproof partition separates the operator from the engine and controls are placed within convenient reach of his adjustable seat. These factors assure ease of operation of the Brownhoist Locomotive Crane, and Brownhoist engineering assures maximum performance. Anti-friction bearings are used throughout including machinery side frames. The boom hoist is worm driven for smooth, safe operation. Dynamatic clutches disconnect all upperworks when travelling . . . give sure, positive control. High strength alloy steels bulwark the machine for heavy service. Throughout, Brownhoist Locomotive Cranes are designed and built for high capacity production. For further information write today for Catalog No. 548.

Approximate visibility from ordinary cab.

Approximate visibility from side-operated cab.

360° visibility from I. B. patented Monitor Type Cab.

Your operator can see exactly what he's working with in the car in front of him. Greater safety is the result.

188

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Washington, Cleveland, Chicago, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Power-Traction

BROWNHOIST

Polyken Tapes have

CONTROLLED STRENGTH

(and that's what saves the money)

CONTROLLED STRENGTH:

the right combination of backing and adhesive to give you "all work—no waste"

Here's how it can help you: Because you can select the right *Polyken* Tape for the right job, you get the exact sticking power . . . the exact moisture resistance, the extra tensile strength . . . the exact tear resistance you need. When you need particular qualities, there's a *Polyken* Controlled Strength Tape that has them.

That way—the Controlled Strength way—you do the job *right* for the *least* amount of money.

Take these *Polyken* waterproof tapes, for example. See how they work harder . . . give greater protection . . . through their "just right" performance on the job at hand. And that usually means a considerable saving.

Controlled Strength reduces packaging costs. This job calls for waterproof tape, but it has to be inexpensive. Low-cost *Polyken* Tape No. 216 solves the cost problem . . . sticks firmly during shipment . . . and protects against water damage and moisture . . . a "just right" selection that provides the necessary balance between quality and economy.

Controlled Strength assures a lifetime seal. Insulation in these refrigerators and freezers must be permanently sealed against damage by condensation and moisture. Premium-quality *Polyken* Tape No. 214 assures airtight lifetime protection.

Use this convenient coupon to find out how *Polyken* Controlled Strength Tapes can mean "all work—no waste" on the job for you.

Polyken, Dept. S-E
222 West Adams St., Chicago 6, Illinois

Please send me physical properties and further information on *Polyken* Controlled Strength Tapes.

Name _____ Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

Polyken®

CONTROLLED STRENGTH

INDUSTRIAL TAPES

THE KENDALL COMPANY, POLYKEN SALES DIVISION

The Columbium Shortage Is Over!

"Electromet" Ferrocolumbium

is now available for Stainless Steel and High-Temperature Alloys

The development of high-speed aircraft has produced a wide-spread demand for high-temperature alloys containing columbium.

Now that the government stock-piling program on columbium has been completed, ample supplies of columbium are once again available for defense and civilian uses. This is important news, as industry may now use this valuable alloying element to attain good high-temperature properties in stainless steel and non-ferrous alloys.

Columbium is added to austenitic chromium-nickel stainless steels to prevent intergranular corrosion and improve strength at high temperatures. A columbium addition of 10 times the carbon content will stabilize stainless steels at temperatures of 800 to 1600 deg. F., thus preventing impairment of corrosion resistance and physical properties. In the high-temperature alloy field, 0.2 to 4.0 per cent columbium will preserve the strength of super-alloys during long exposures to temperatures up to about 1550 deg. F., or slightly higher.

ELECTROMET furnishes columbium in two forms: ferrocolumbium and ferrotantalum-columbium. Ferrocolumbium contains 50-60 per cent columbium, while ferrotantalum-columbium contains approximately 40 per cent columbium and 20 per cent tantalum. Both of these ferro-alloys are available in a number of crushed sizes and give a 90 per cent recovery of columbium.

For further information about ELECTROMET columbium alloys, please contact the nearest ELECTROMET office listed below.

Columbium-bearing stainless steels are widely used in chemical equipment where resistance to corrosion at high temperatures is necessary.

Electro Metallurgical Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

50th Anniversary Electromet 1906 1956

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

You'll find it HERE!

. . . just about every kind of grinding wheel you can think of . . . from the smallest mounted wheel to the largest roll grinding wheel. Simonds makes them all—all top quality and engineered for your jobs!

Get the Simonds Data Book and Stock List with Consumer Net Prices—and you're set to get the grinding wheels you need, quickly!

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco. Distributors in Principal Cities

Division of Simonds Saw and Steel Co., Fitchburg, Mass.

MALLEABLE

SHOT *and* GRIT

. . . of dependable quality

METAL BLAST's modern methods produce better abrasives. METAL BLAST's mass production permits lower prices. That's why you'll find METAL BLAST abrasives in leading foundries . . . everywhere. If you haven't tried them — you should!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

THE LARGEST INDEPENDENT MANUFACTURER OF ABRASIVES . . . PRODUCING THE FINEST CHILLED AND MALLEABLE SHOT AND GRIT ON THE MARKET

There's MORE *Cooling Surface* with Allis-Chalmers MOTORS

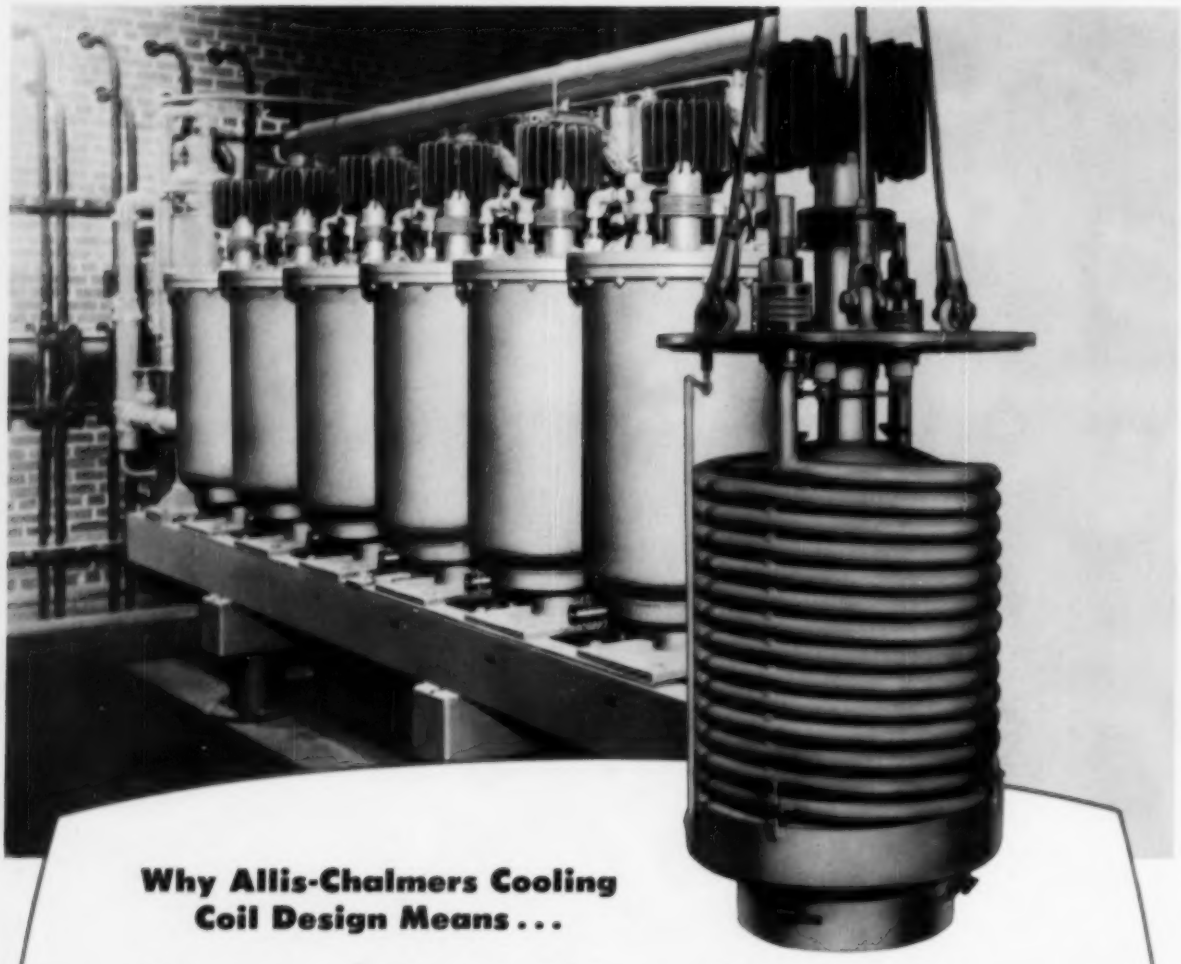
Why Rib-Type Motors Won't Fry

STRETCH OUT RIB DESIGN of Allis-Chalmers motors and see the greater cooling area provided — as much as 43% on many models. Insulation won't fry under normal conditions with deep-rib construction because every rib adds to the heat-dissipating surfaces. The result—moderate overloads can be taken in stride with little fear of burnouts.

As a new machinery component or as replacement, specify Allis-Chalmers. To find out more, contact your nearby A-C district office, distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-4582



Why Allis-Chalmers Cooling Coil Design Means . . .

Better Rectifier Operation

More Efficient Heat Transfer results from internal cooling coil. The steel coil surrounds active parts, offering more cooling surface and better heat transfer than other types. Unit maintains more uniform temperature and mercury vapor pressure.

Simplified Maintenance results from Allis-Chalmers unique unit construction. All active components are attached to the anode plate for easy withdrawal, dismantling, and re-assembling — as illustrated above.

Positive Arc Barrier is formed by the cooling coil, which is insulated from the tank. The main arc is confined within the coil, preventing arc transfer to the tank.

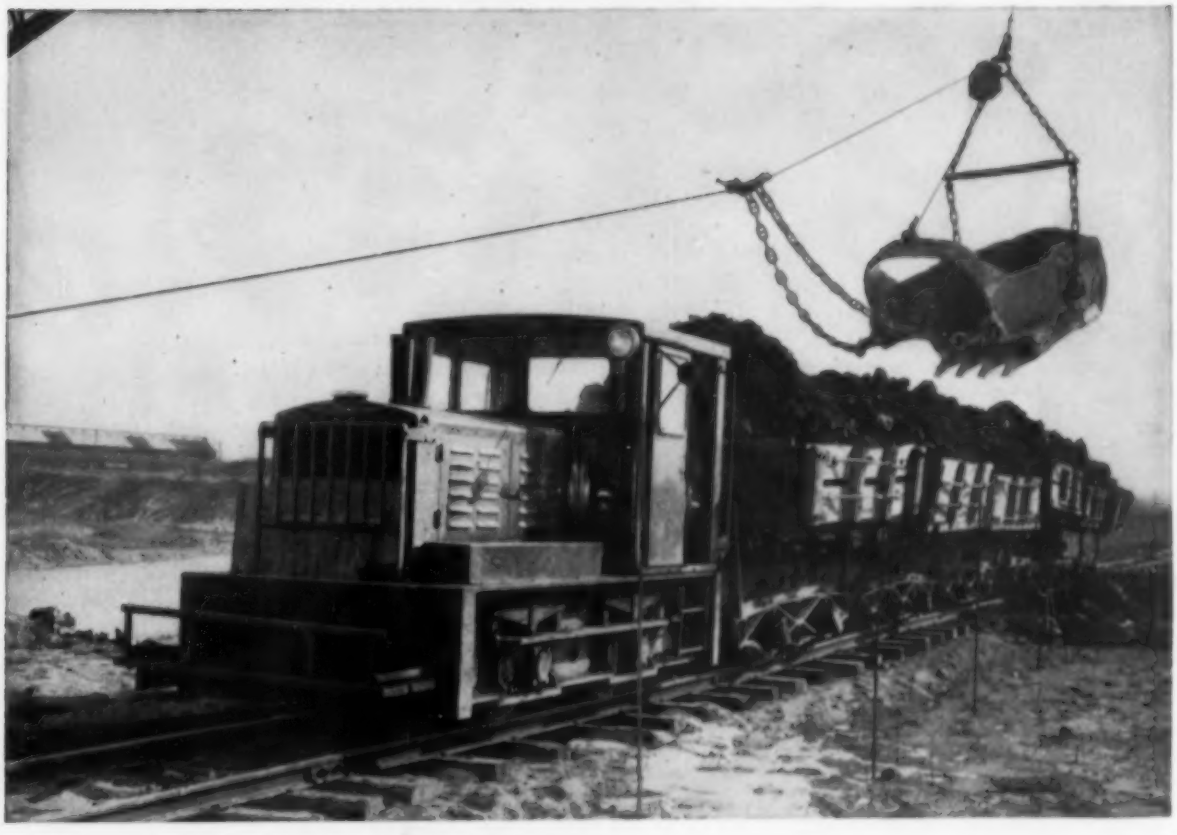
Years of Operation in hundreds of installations have proved the reliability, ease of operation, and simplified maintenance of Allis-Chalmers mercury arc rectifiers. You can get complete information at your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5084



AT CHICAGO BRICK CO., DALTON, ILLINOIS

Plymouth Puts its Power on the Payload

WITH ASSIST FROM TORQUE-CONVERTER COUPLING

"Our operation is a common one, and not very dramatic," says Mr. Robert Coleman, Plant Superintendent. "All we require of our locomotive is to be on the job day after day hauling 650 to 700 cubic yards of clay from pits to ovens and do it economically without downtime and maintenance costs."

"And our Plymouth fills this big bill. It operates economically and puts its power on the payload, where it counts. The Torqomotive Drive and the Fuller torque-converter coupling transmit Plymouth's power to the load without spinning the wheels, make starting and stopping smoother, let the Plymouth 'dig' into the job with just the amount of power needed to move the load. It's easy to operate, and we haven't had a bit of trouble with it. We don't waste any power at Chicago Brick now!"

You could be wasting power, adding needless costs to your operation. Find out how a Plymouth can smooth out your operation, cut costs. Models from 3 to 70 tons. Gasoline or Diesel, mechanical or Torqomotive Drive.* Also Diesel-Electrics. Send a brief outline of your requirements for free analysis by F-R-H engineers — no obligation on your part, of course. ADDRESS: PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-1, Plymouth, Ohio.

PLYMOUTH® TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

Use the lube that can carry the load

Whatever metal you're rolling, reduction gears and their bearings will run smoother and cost you less for maintenance when *Texaco Meropa Lubricant* is on the job. And there are good reasons why—

Texaco Meropa Lubricant has special extreme pressure properties that enable it to withstand shock loads and continued heavy duty service—for longer periods than other lubricants. This is due in part to polar additives that enable *Texaco Meropa Lubricant* to cling tenaciously to metal under *all conditions*—even immersion in water.

In addition, *Texaco Meropa Lubricant* resists oxidation, thickening and foaming. It will not separate in use, storage or centrifuging. It is non-corrosive to bearing metals.

A Texaco Lubrication Engineer will gladly help you get maximum efficiency from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO **Meropa Lubricants**

FOR STEEL MILL GEAR DRIVES

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE on television . . . Saturday nights, NBC.

STEEL

May 14, 1956

Metalworking Outlook

Memo on Nickel

Look for relief from the nickel shortage—after 1958. A continuing scarcity of the metal through 1958 is likely as long as defense requirements remain at current levels. About 40 per cent of the metal available to the U.S. now goes for defense or the stockpile. Nickel production capacity is increasing. The 222,500 tons expected to flow in 1956 into the free world's military and civilian coffers will be 7500 tons more than was produced last year. The U.S. gets about two-thirds of this. Major expansion projects that will bring eventual relief are at Nicaro, Cuba; in Canada; and at Riddle, Oreg. Pressure is mounting from nickel users to modify U.S. stockpile policies.

That Truitt Case

That troublesome Truitt case is back. By a 6 to 3 vote, the Supreme Court has upheld a National Labor Relations Board order that the Truitt Mfg. Co., Greensboro, N. C., disclose its financial records to the AFL-CIO Bridge, Structural & Ornamental Iron Workers Union to back up Truitt's claim that a 10-cent-an-hour pay boost would be financially ruinous. The High Court limited its ruling to Truitt alone, carefully stating: "We do not hold that in every case in which economic inability is raised as an argument against increased wages it automatically follows that the employees are entitled to substantiating evidence. Each case must turn on its particular facts." But this is a foot in the door for labor and no victory for management.

Labor Recruiting Slips

Unions are stepping up membership drives, but the effectiveness is the lowest in 20 years. At elections conducted by NLRB this year to let workers choose whether they wanted to be represented by a union, in only 64 per cent did they vote yes, the lowest in two decades. A big area for recruiting is among white-collar workers. The United Steelworkers is one of the latest unions to step up its activities there.

Steel Machinery: Backlogs Rising

Look for steel mill equipment order backlogs to average 24 months soon. Already, some builders are booking into 1958. Average backlogs are 15 to 18 months. Mesta Machine Co.'s high bid for the U.S. foundry and machine plant at New Castle, Pa., is proof of equipment builders' optimism and their need to expand.

U.S. Steel Notes

U.S. Steel Corp. is experimentally producing a plastic-coated steel. Market possibilities may be in autos—inside glove compartments, for example . . . The corporation is also studying the possibilities of porcelain-enameled

Technical Outlook—p. 117 Market Outlook—p. 193

stainless steel, heat-treated constructional steels, electrical steels for turbines and steel for applications in temperatures of 1300°F and higher . . . It has in the works an aluminum-coated steel which may be used for such things as car mufflers, ovens and containers.

Grain Bins for Uncle Sam

Uncle Sam is back in the grain bin market, to the tune of $30.2 million (including materials, transportation and setting up). The program takes 30,765 circular steel bins, each requiring 3968 lb of steel. Galvanized sheet is the big item, plus angles and fasteners. So far, not too much trouble in acquiring the steel has been reported.

GE Starts Diamond Output

General Electric Co. has begun pilot plant production of industrial diamonds. It has already made them in sizes used for 80 per cent of the industrial market, which has been taking $50 million worth a year of the natural variety. Dr. C. G. Suits, GE vice president and director of research, believes that the eventual market for industrial diamonds—both the mined and the manmade varieties—will be $200 million when research and technology have advanced enough to bring prices down on the manmade type.

Missile Matters

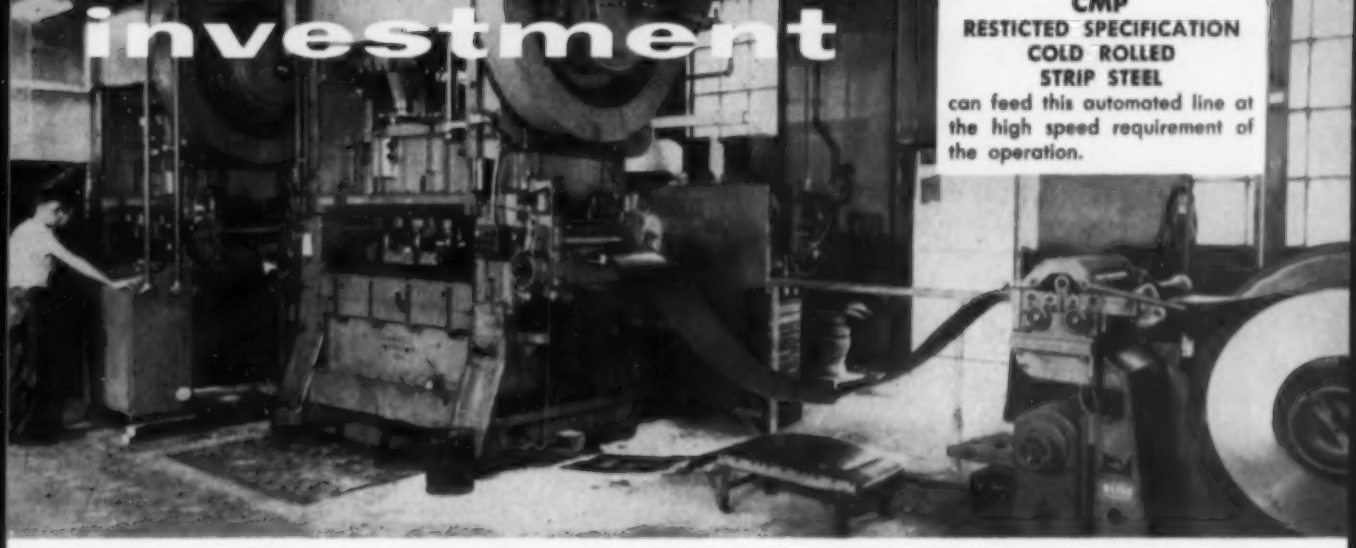
Look for an intercontinental missile to be made by Convair Division of General Dynamics Corp. at a new $40-million plant it's building at Sorrento, Calif. Lockheed Aircraft Corp. indicates it will spend at least $30 million this year and next for facilities and equipment for its missile system division.

Expansion in Chemicals

Watch for the chemical industry to spend $1.4 billion on new plant and equipment in 1956. That's 40 per cent above the 1955 levels and about matches the 1953 expenditures of $1428 million. Chemical producers, says Business & Defense Services Administration, estimate a capital outlay of $650 million in the first half, about $750 million in the second six months.

Straws in the Wind

Within ten years, almost all helicopters produced in the U.S. will be powered by gas turbine engines, GE predicts . . . Great Lakes vessel operators predict that 1956 ore shipments will pass the 90-million-ton mark, despite bad weather in April which restricted movement . . . Curtiss-Wright has begun production operation on the 12,000-ton steel extrusion press at its Buffalo plant . . . Engineers & Scientists of America, the engineers' union, has rejected affiliation with AFL-CIO . . . A record of 8,255,824 tons of finished steel was shipped in March, says American Iron & Steel Institute . . . Revised plant specifications will delay for six months the construction of the Chevrolet assembly plant near Youngstown; under the new schedules, ground breaking will take place early in 1957.



Costly new equipment is not always the sole answer to production cost problems. Often the wrong raw material may completely nullify expected savings from heavy capital investments in modern machinery.

Consider the case of one manufacturer who installed expensive new forming equipment but was unable to up production to the expected level. Material being formed was cold rolled strip 4" x .060", AISI 1050 steel processed to standard gauge tolerances (.0567" to .0632").

When **CMP** Precision Cold Rolled Strip Steel ordered to a 60% gauge restriction (.0587" to .0613") was furnished, production immediately moved up to the rated capacity of the machines and has remained there.

In addition to increased production, because of the minimization of down time, an incidental and important benefit was the increase in yield per **CMP** ton processed because rejections and out of tolerance parts were eliminated.

Careful consideration of **CMP** Restricted Specification Cold Rolled Strip Steel alternatives on the same careful basis given to your equipment investment, may point the way to similar, or larger pay-offs.

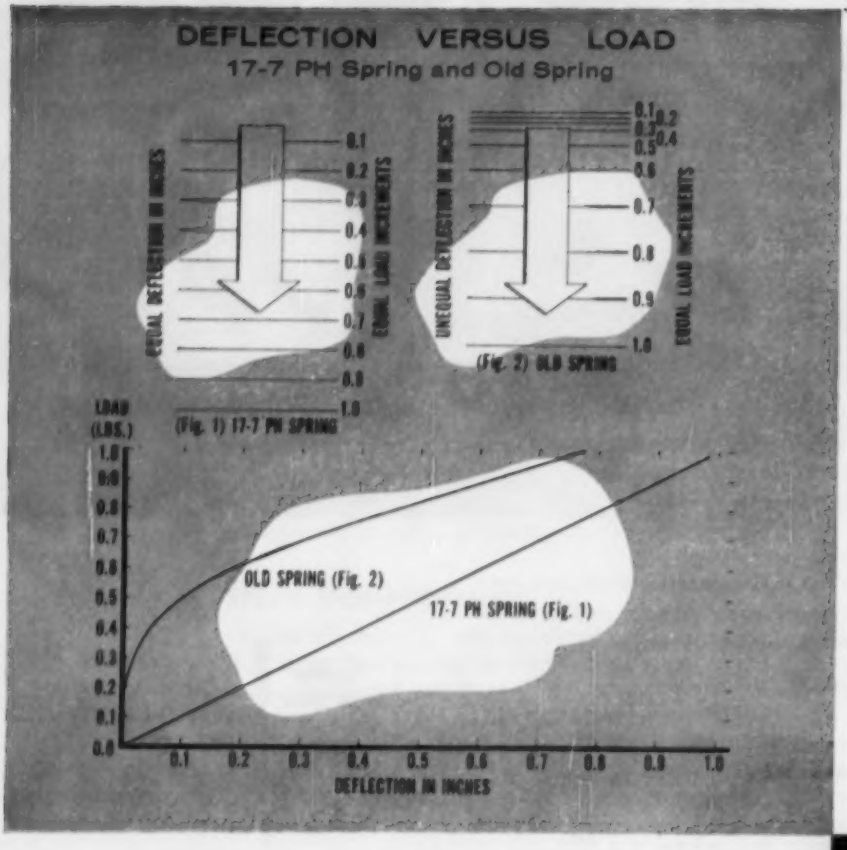
Why not check the possibilities today?

CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

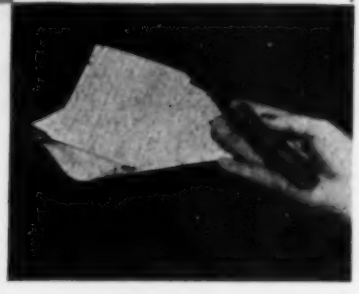
C·M·P

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: NEW YORK CLEVELAND DETROIT INDIANAPOLIS CHICAGO LOS ANGELES SAN FRANCISCO



(Fig. 1). The 17-7 PH spring deflects equal increments with each additional 0.1 pound load. The first 0.1 pound deflects the spring almost exactly the same amount as the last 0.1 pound.

(Fig. 2). The old spring deflects unequal increments. Deflection at the first 0.1 pound load is entirely different from the last.



Armco 17-7 PH Wire Solves Stacker-Spring Problem at Lowest Cost

Ideal physical properties and relatively low cost made Armco 17-7 PH Stainless Steel wire top choice for stacker-springs in a new 1000-card-a-minute sorter.

Stacker-springs on this rapid-fire equipment had to have zero initial tension. This meant no pressure between turns at no load. In addition, the springs were required to have a constant stacking rate . . . deflect proportionately for each equal load addition and have close tolerances.

Springs of Armco 17-7 PH wire, formed by the same method as standard extension springs, were found to have these essential properties after one simple heat treatment. And they proved lowest in cost. The only other spring that did the job cost 5 times as much as the 17-7 PH springs.

Versatile Spring Wire

Besides high load capacity and dimensional stability, Armco 17-7 PH Stainless Steel wire offers excellent resistance to heat and corrosion. Mechanical properties and modulus of elasticity are generally comparable to music wire.

Armco 17-7 PH is supplied in round or flat wire, in bars, sheets, strip and plates. A companion precipitation-hardening grade, Armco 17-4 PH, is produced in bars and wire.

One of these special Armco Stainless Steels may prove to be the most economical answer to your product-problems. Let us send you complete information. Just write us at the address below.

ARMCO STEEL CORPORATION

876 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Tune In on Users

Distribution, that conveyor belt between production and consumption, is coming in for closer study by metalworking managers. As more and more water is squeezed out of production costs, distribution becomes a natural frontier for further economy and efficiency. It still is a relatively unexploited frontier.

Creating and serving the market are functions of distribution. In researching No. 4 in this magazine's 1956 Management Series (Metalworking Goes to Market, page 107) the editors find that one aspect of distribution badly in need of improvement is communication. Heretofore, most distribution communication has flowed in only one direction—from the manufacturer to the consumer. Relatively little moves from the user back to the maker.

Two developments are making a complete circuit of distribution communication essential. One is automation. The other is the rise of employer-financed Supplementary Unemployment Benefit plans.

SUB provides a strong economic incentive to level out the peaks and valleys of production and employment. The company with employment on an even keel will have a distinct labor cost advantage over competitors with fluctuating employment.

Automation requires the establishment of a fairly constant market as an absolute first condition. That market must be predictable for at least a medium term into the future. Otherwise, we cannot afford automation.

Economist Peter Drucker suggests that to apply automation to the manufacture of kitchen appliances would require an organized market for second-hand appliances. It might even be necessary for the manufacturer to stop selling appliances. Some day he may be selling the housewife a five-year service policy, with the appliances on loan or rental at a nominal fee. At the end of five years, they would be replaced by new appliances—making possible a predictable production schedule.

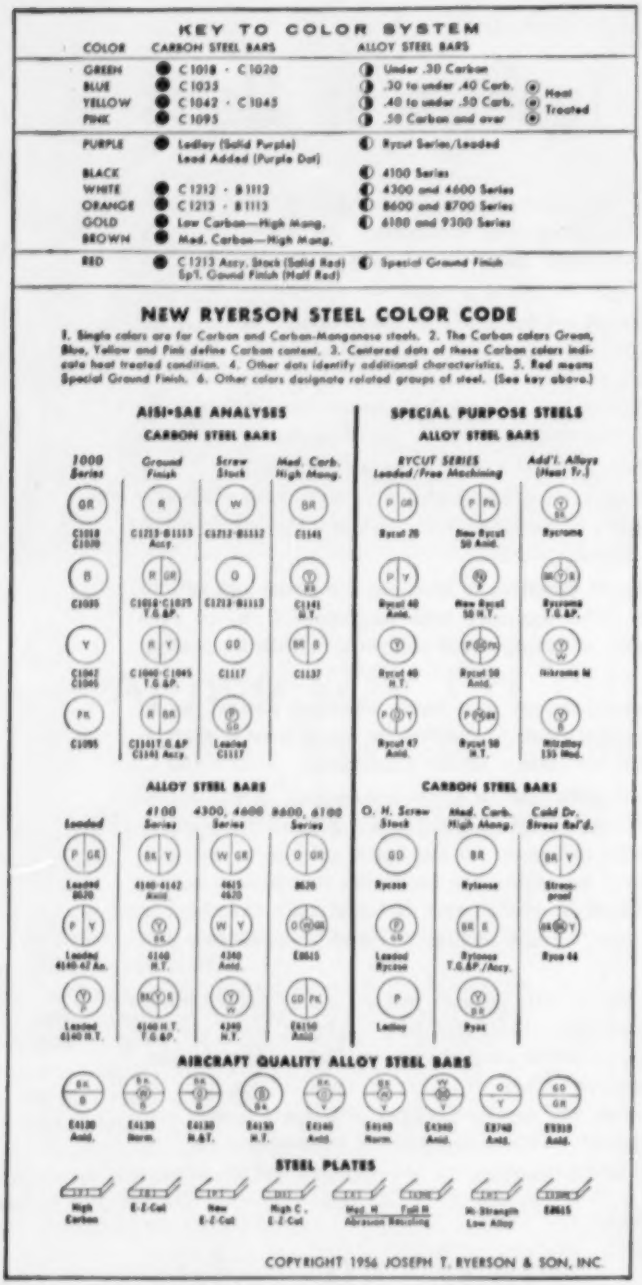
Establishing predictable markets will require metalworking managers to learn much more about their business. They will have to learn what the demand expectations are, what the customer wants in the way of a product—size, design, styling, color and accessories. They will have to learn better how the customer wants to be sold, served and serviced. They will require new concepts and methods for obtaining information and making measurements.

The time has come to tune in on the user.

Walter J. Campbell

EDITOR

NEW COLOR CODE for steel identification



KEY TO COLOR SYMBOLS:

A—ALUMINUM BK—BLACK GD—GOLD O—ORANGE PK—PINK W—WHITE
B—BLUE BR—BROWN GR—GREEN P—PURPLE R—RED Y—YELLOW

For Stainless steels and other products, use your Ryerson Stock List

More logical system aids quality control

Accurate identification of steel—always a point of paramount importance with Ryerson—now becomes even more meaningful than before with the introduction of a new system of color marking.

Based on logical groupings of related types of steel, this new Ryerson color code is easy to understand, remember, and use. It strengthens still further the rigid program of quality control that for years has guarded the known high uniform quality of Ryerson Certified Steel.

Here's how the system works:

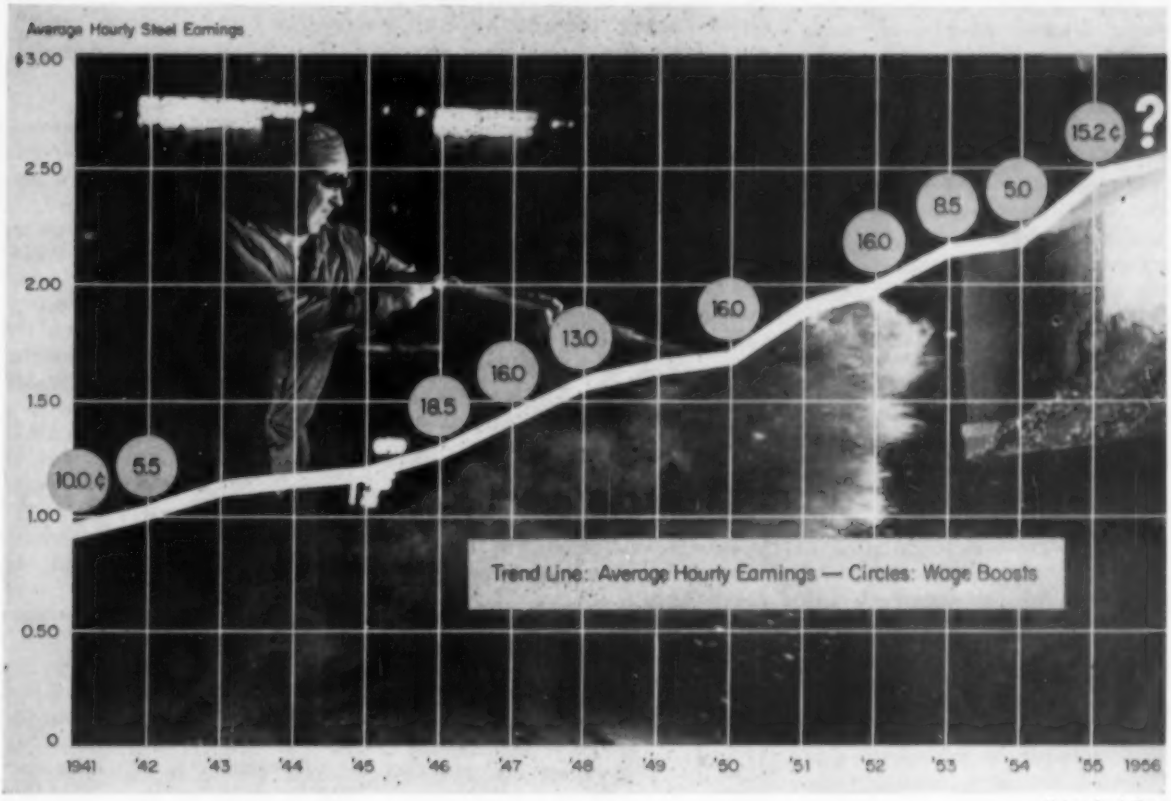
1. Single colors are used for standard Carbon and Carbon Manganese Steels.
2. The colors GREEN, BLUE, YELLOW AND PINK always define Carbon content.
3. Centered dots of these Carbon colors always indicate the heat treated condition.
4. Centered dots of other than Carbon colors identify characteristics other than analysis, carbon content or the heat treated condition.
5. PURPLE, BLACK, WHITE, ORANGE, GOLD and BROWN each designate a related group of steels.
6. RED marking of any kind always indicates Special Ground Finish.

If you do not already have this new steel identification chart, we will be glad to send a copy (printed in full color) for your Ryerson Stock List. Call or write your nearby Ryerson plant, or write Box 8000-A, Chicago 80, Illinois.

RYERSON

JOSEPH T. RYERSON & SON, INC.

PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. PHILADELPHIA · CHARLOTTE, N. C. · CINCINNATI · CLEVELAND DETROIT · PITTSBURGH · BUFFALO · CHICAGO · MILWAUKEE ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE



Kaiser Steel Corp.
Figures: AISI

Odds Against a Steel Strike

But they'll shift in favor of a walkout if the union is serious about its demands for weekend premium pay. Other crucial issues: Pay boosts, SUB, insurance

CHANCES ARE about 3 to 2 against a steel strike.

Today and tomorrow (May 14-15), the United Steelworkers' wage policy committee has been called in to Pittsburgh to approve demands. Negotiations will begin about June 1 on a new contract to replace the current one which expires June 30.

Premiums—If any demand provokes a strike, it will be the one on premium pay for Saturday and Sunday, as such. A steelworker now gets premium pay for weekend work only if Saturday or Sunday happens to be his sixth or seventh successive day of work. The union wants the premium written into the contract "because we want a Monday-through-Friday work week just like anybody else," says Steelworker President David J. McDonald. He adds: "On week ends a steelworker wants to be home with his family and his God."

It's not practical for a steel company to shut down many of its operations over week ends. For those continuous jobs, it will cost 55 cents an hour extra to pay weekend premiums. Averaged over all workers on both continuous and interruptable jobs, the cost would be lower, but still prohibitive.

Students of labor suspect this demand is for headline purposes. Watch for a compromise, probably in higher shift differentials.

Pay—Five or six cents an hour will be the rock-bottom figure the union will settle for here because that's about what the auto workers will get this year on their automatic annual improvement and cost-of-living provisions.

The company argument will be that record earnings are needed to help finance the record $1.2-billion expansion in 1956, and that steelworkers already are among the best paid in the U. S. (see chart above and table on page 68).

SUB—This is the third important demand. The union wants an arrangement similar to that worked out last summer with the can companies, so qualified workers will get layoff benefits for 52 weeks.

The steel industry will balk at the 52-week guarantee, but the union will want more than the 26 weeks provided for in the auto contracts. Labor experts are guess-

ing: A compromise, perhaps benefits for 39 weeks?

Insurance—Here's the fourth major demand. At present, companies and employees share equally in the 9-cent-an-hour cost of a social insurance program. Mr. McDonald will demand that industry pay all—and give wider coverage.

The industry won't lightly bargain away the shared-payment feature for insurance.

Other Demands—The steelworkers will also ask for a full union shop, but this isn't one that will get much play unless it becomes a trading issue. The industry has a modified union shop. Another trading issue will be the perennial demand for longer vacations, an extra holiday.

Adjustments will also be asked in seniority provisions, another standard request. In the day-to-day workability of the contract, they're important but their impact on cost is minor.

Long-Term Contract—The union doesn't want more than a two-year pact, reopenable on wages only after one year. Most—but not all—in steel management want a three or five-year document. Look for this compromise: A long-term contract, reopenable annually on wages.

Terms on pensions, insurance, perhaps SUB, would last for several years. That would have the advantage of getting all provisions expiring on uniform dates. Although insurance will be negotiated in June, the agreement doesn't expire until Oct. 31, 1956. Pension terms don't expire until Oct. 31, 1957. If a long-term contract is decided upon, incidentally, both sides may agree to talk about pensions now.

Influences—On contracts negotiated thus far this year, the national pattern has been for a 12-to-15-cent package, about 8 cents of which is for wage boosts.

In some industries, the wage hike has been substantially higher than the 8-cent average. Oil companies granted about 15 cents. Aircraft workers got 11 cents.

If the cost of the steel package doesn't exceed 18 or 20 cents, some labor observers are betting there won't be a strike. But if the union is adamant on provisions that will cost more than 20 cents—and the week-end premium issue alone will be more expensive than that—brace yourself for that walkout at midnight, June 30.

To Spend Half-Billion a Year

U. S. Steel Corp. will spend $500 million a year to increase its ingot capacity 1 million tons annually for the next ten years. Expansion costs will total $150 million, while replacement of equipment will amount to $350 million, reported Roger M. Blough, chairman.

Commenting on the high replacement figure, Mr. Blough said an open-hearth furnace which cost $10 million to build in 1930 would cost $64 million today.

Pay Increases: Steel Vs. Other Industries

Industry	Average Hourly Earnings: Year 1939	January 1950	December 1955‡	Increase 1939 to Dec. 1955‡	Increase Jan. 1950 to Dec. 1955‡
Blast furnaces, steelworks and rolling mills	$0.838	$1.675	$2.47	$1.632	$0.795
Electrical machinery	NA	1.431	1.92	NA	0.489
Automobiles	0.915	1.715	2.33	1.415	0.615
Textile-mill products	NA	1.202	1.42	NA	0.218
Meat packing, wholesale	0.690	1.419	2.19	1.500	0.771
Tires and inner tubes	0.946	1.763	2.49	1.544	0.727
Mining—Bituminous coal	0.886	1.933	2.68	1.794	0.747
Mining—Copper	0.679	1.585	2.24	1.561	0.655

‡Preliminary
NA—Not Available
Source: U. S. Bureau of Labor Statistics and AISI

Kaiser Ups Ante

We must boost aluminum capacity even faster to satisfy demand, says Kaiser spokesman

"KAISER Aluminum & Chemical Corp., and the aluminum industry, may have to accelerate their expansion in the future."

That's how Donald E. Browne, Kaiser's vice president and treasurer, summed up business prospects before the Cleveland Society of Security Analysts last week. By 1965, he forecast total aluminum consumption of 4 million tons. He added: "We expect today's supply shortage to continue through 1957. There will be a slight surplus in 1958, with the shortage re-appearing in 1959."

Sparking Sales — The electrical industry, he said, offered one big growth market. He expects it to quadruple its take of aluminum over the next decade.

For example, he says: "One Pacific Coast utility is dismantling 145 miles of perfectly good 30-year-old copper weighing 7 million lb and replacing it with aluminum weighing 4 million lb. Why is this profitable? Because the aluminum will provide 20 per cent more current-carrying capacity and because the utility will be able to pay for the job and still put money in the bank by selling the copper."

Growth Markets — Doors and windows, said Mr. Browne, took some 170,000 tons of aluminum last year. He predicted that they would use about 380,000 tons by 1965. "Up to 500,000 tons of aluminum a year may go into school construction, about 65,000 tons into curtain walls and building panels."

Biggest potential of all is in the automobile industry. Mr. Browne estimated that the average '65 model would contain at least 95 lb of aluminum compared with under 30 lb for last year. "Over and above this estimate, there's a further potential of about 125 lb per car in doors, hoods and rear deck lids." The average could easily go above 300 lb per car, said Mr. Browne, if wheels, bumpers, trim and engine blocks go aluminum. "Regardless of which figure you take, if you multiply it by 7 or 8 million cars a year, you have tremendous potential."

Top Jobs Go Begging

"WE'VE been searching for a new plant manager for the last two years. The right man's worth $30,000 to us. We've had few candidates, almost none of whom we could consider seriously."

This complaint is from a 2500-employee Ohio metalworking company. But it's heard every day throughout industry. To get the specific top skills they need, other companies have gone as far as buying a plant to hire its president.

Consensus: Outside help is good—if you can get it. Self-help is the major answer over the long pull: Companies must rely upon their executive development programs for new talent.

Dimensions—There are no figures on the number of top jobs going begging. But there is evidence that the shortage is serious. Help-wanted columns are becoming a shopping place for top bracket help. Growth of organizations like the American Management Association, New York, is added testimony. In 1946, 17,000 management apprentices took its training courses. This year, industry will send more than 60,000.

Most desirable key men are in their 40s. People in this age group had their careers interrupted or cut off by World War II. But there are other, more lasting reasons for the shortage. Industry's unprecedented expansion and the trend away from family and toward professional management are close to the top of the list.

Action—AMA's growth is testimony that something is being done. Its function is to teach and perfect management skills. In 1946, one of its surveys showed that only 5.2 per cent of respondents had formal management development programs. By last year, 88 per cent of respondents were giving the problem regular attention. But, 75 per cent were AMA members.

Even in the most progressive companies, development from within isn't always possible or desirable. New product lines always cause problems. Like most auto makers, Chrysler Corp. has a promote-from-within policy. When it landed a Navy contract for guided missiles, it had to bring in an outside specialist to head up operations. Another company found itself with too many supervisors for production workers. Management was unable to do an objective job of cutting back, so an outside man was brought in.

Management is realizing that new blood may pay off more in smartening up the company than its possible penalties in hard feelings.

Where—Where do you start to look for new talent? One practical cynic suggests hiring the number one or two man away from your competition. A placement specialist says go to the people who give you professional service—your lawyer, accountant, management consultant.

Another popular technique: Watch merger and acquisition news. Such corporate changes often put good people on the market. Advertising in business journals in your field or in newspapers can help. The hunt can also be initiated through professional societies, alumni associations and management training courses.

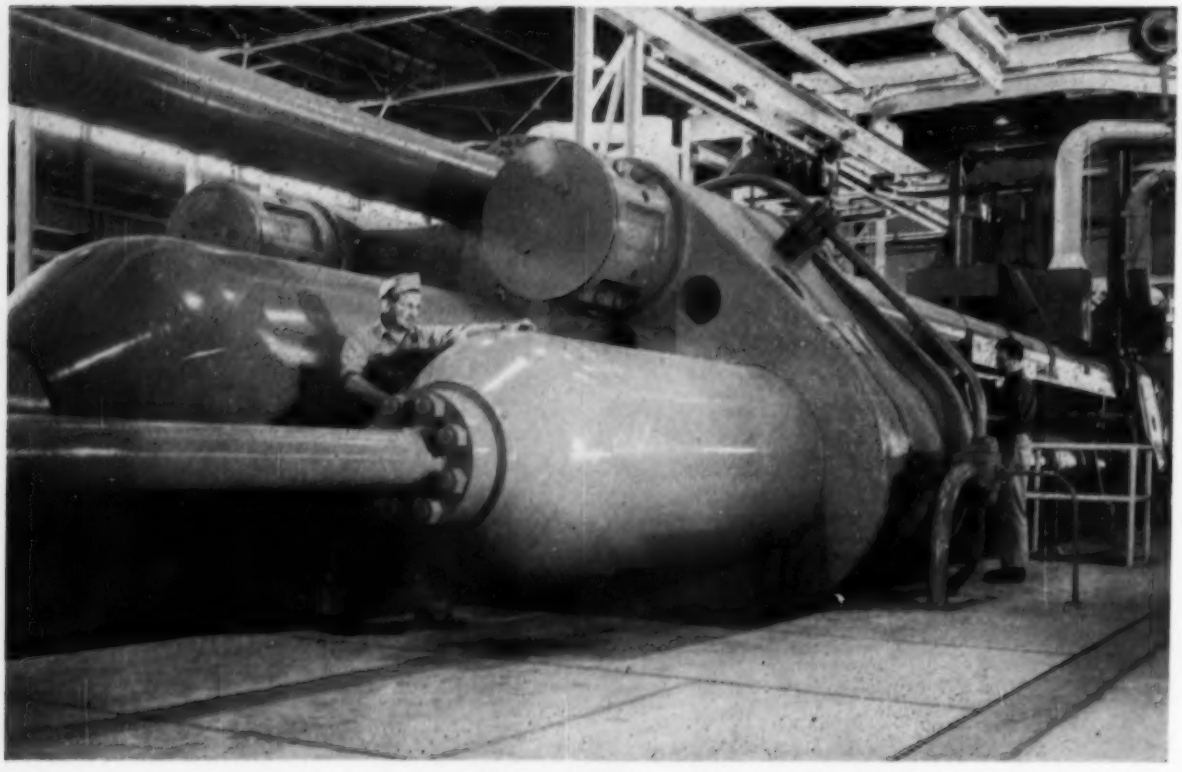
How—Many companies enlist the aid of management consultants. At least 15 of these (most of them are in New York) do a big business in top talent. The consultant can help because:

He has current knowledge of available talent. His own activities may cause job dislocations. And he may save money for you. Points out Methods Engineering Council, a Pittsburgh consultant: "We may talk to 20 possible candidates for each one we recommend. If a company vice president had done the interviewing, it could have taken him up to 40 hours and cost the company as much as $1000 for his time."

Outlook—There's little prospect of immediate easing in the talent squeeze. Labor shortages can be eased by automation, but you can't do the same for a shortage of management. Industry men agree that the only solution is to set up more and better management development programs.

The advice of one type of management consultant, the industrial psychologist, can help you make your program successful. Says Dr. J. E. Janney, of Rohrer, Hibler & Replogle, Chicago: "Programs must make the distinction between teaching skills and developing top leaders. Skills can be taught on a classroom basis. Management development must be handled on the job."

Dr. Janney suggests that the primary problem is to help top management do a better job of coaching. "You must start with the top operating executive. He can help spark the next men down the line and from there the whole company. Company size doesn't matter. Using the right techniques, every man will play away above himself, like a second division man who joins the Yankees."



Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corp., designed and built this 12,000-ton hydraulic extrusion press for Curtiss-Wright Corp.

Extrusions Solve Problems

THE TREND toward forming steel by squeezing it like tooth paste from a tube is growing so rapidly that no one has compiled production statistics. While much of the production is for confidential work in defense industries, there's unbounded enthusiasm about commercial sales prospects.

Twin Requirements—Two growing needs boost demand for steel extrusions. Industry requires more steel in hard-to-roll shapes. Aircraft manufacturers want alloys which serve efficiently in high-temperature applications.

Since 1954, Allegheny Ludlum Steel Corp., Pittsburgh, has extruded stainless shapes and seamless tubing at Watervliet, N. Y. "With sales strong and steady in extrusions (which include zirconium and titanium), there's further expansion under way. In 1956, we are entering the extrusion of tool steel for the first time," company officials report.

Many Customers — Jones & Laughlin Steel Corp. sees "bright prospects" for its solid carbon and alloy steel sections which have been extruded since 1955 at the firm's Pittsburgh plant. Sales executives say: "We're spending much time discussing possible applications in customers' plants, as we broaden our range of shapes and alloy grades extruded. We often surprise potential users by showing the amount of machine work which can be eliminated by switching to extrusions."

At J&L, most extrusions are complex sections which can't be rolled, or small sections which would be uneconomical to roll. Customers include producers of business machines, jet engines, electrical equipment, agricultural machinery and machine tools.

Aircraft Supplier — National Tube Division, U. S. Steel Corp., installed a 2500-ton extrusion press at Gary, Ind., in 1952. Now in full production, it supplies a single market—stainless steel shapes for jet engines. "We are too busy filling the needs of jet engine manufacturers to promote commercial markets," National Tube officials comment.

Any expansion at Gary will probably aim at a large potential market for small, complex, heat-resistant sections for aircraft frames. Steel extruders say the aircraft industry needs a wider range of unrollable sizes and shapes in steel and titanium alloys.

Wider Market—H. M. Harper Co., Chicago, supplies a broad market with extruded carbon and stainless steel and high-temperature alloys, titanium and its alloys and copper-base specialty bronzes. Harper extrudes 80 per cent of its output of fasteners.

"After our first announcement that we were broadening into extrusion of shapes, buyers over-

whelmed us with orders," sales officials report. Harper's extruded fasteners are sold to electrical, chemical, marine and aircraft industries. Principal markets for shapes are the aircraft and electrical industries. "We hold seminars in customers' plants, showing them where they can use extruded parts profitably," officials add.

Tube Extrusion — Babcock & Wilcox Co.'s tubular products division, Beaver Falls, Pa., concentrates on extrusion of tubing in hard-to-work alloys. B&W's 2500-ton press squeezes out molybdenum, zirconium, titanium and steel, mainly for high temperature or corrosion applications. Growing markets include producers of heat exchangers.

The firms named are the only steelmakers licensed to use the French Ugine-Sejournet hot extrusion process. (A sixth one, International Nickel Co., holds a license to extrude nickel alloys).

Developed during World War II, the method made possible the economical extrusion of steel sections and tubing. For more than 25 years, steelmakers searched for an antiweld ingredient which would make it possible for them to pass a steel billet heated to 2000°F through a die without damage.

Largest Press—The bulk of hot steel extrusion is under Ugine-Sejournet license, although Curtiss-Wright Corp. has a 12,000-ton extrusion press at Buffalo which uses other lubricants. It was designed and built by Loewy-Hydropress Division, Baldwin - Lima - Hamilton Corp., Philadelphia, under the Air Force's heavy press program. The press is the largest in the U. S. for steel extrusion.

Growing Interest — Pressmakers report that successful results by extruders cause "quite a few" inquiries about extrusion presses from companies not previously interested. New design trends include faster, more automatic, more mechanized handling of billets and larger presses requiring a minimum of maintenance.

Only a few problems mar a bright sales future. One steel extruder points out: "We have excellent presses. What we need are improved supplementary equipment and several more years of experience."

Progress goes on parade as . . .

Founders Stage a Show

THOUGH true automation is some distance away, its elements already are helping to bring a new look to the foundry industry.

Many of the developments in techniques and equipment which will mold the pattern of tomorrow's plant were on display last week at the 60th Annual Casting Congress & Show in Atlantic City, N. J.

Trends—Shell molding is booming. Spokesmen estimate that at least 500 U. S. foundries are using the process. Many exhibits showed applications of it. The CO_2 process

FRANK W. SHIPLEY
President, American Foundrymen's Society

for hardening cores and molds was extensively demonstrated, too.

Materials came in for their share of attention. Malleable base spheroidal iron was shown for the first time by Albion Malleable Iron Co., Albion, Mich. Several new binding compounds were on display. One, a hot-air cure resin mix, set an 8½-lb core in 55 seconds.

Mechanization dominated operating equipment exhibits. Much of the new equipment is engineered with pushbutton controls for semi or full automatic cycling.

New Officers—Frank W. Shipley, foundry manager, Caterpillar Tractor Co., Peoria, Ill., was elected president of the American Foundrymen's Society, succeeding Bruce L. Simpson, president, National Engineering Co., Chicago. New vice president is Harry W. Dietert, Harry W. Dietert Co., Detroit.

Named directors for three years were: Alex W. Pirrie, foundry superintendent, Standard Sanitary & Dominion Radiator Ltd., Toronto; Roger W. Griswold, superintendent, foundry division, Erie Malleable Iron Co., Erie, Pa.; Gerald R. Rusk, president, Freeman Supply Co., Toledo, O.; R. V. Righter, plant manager, Central Foundry Division, General Motors Corp., Danville, Ill.; Garnet P. Phillips, general supervisor, foundry research, International Harvester Co., Chicago; and Herbert Heaton, foundry superintendent, Letson & Burpee Ltd., Vancouver, B. C.

Institute Speakers Named

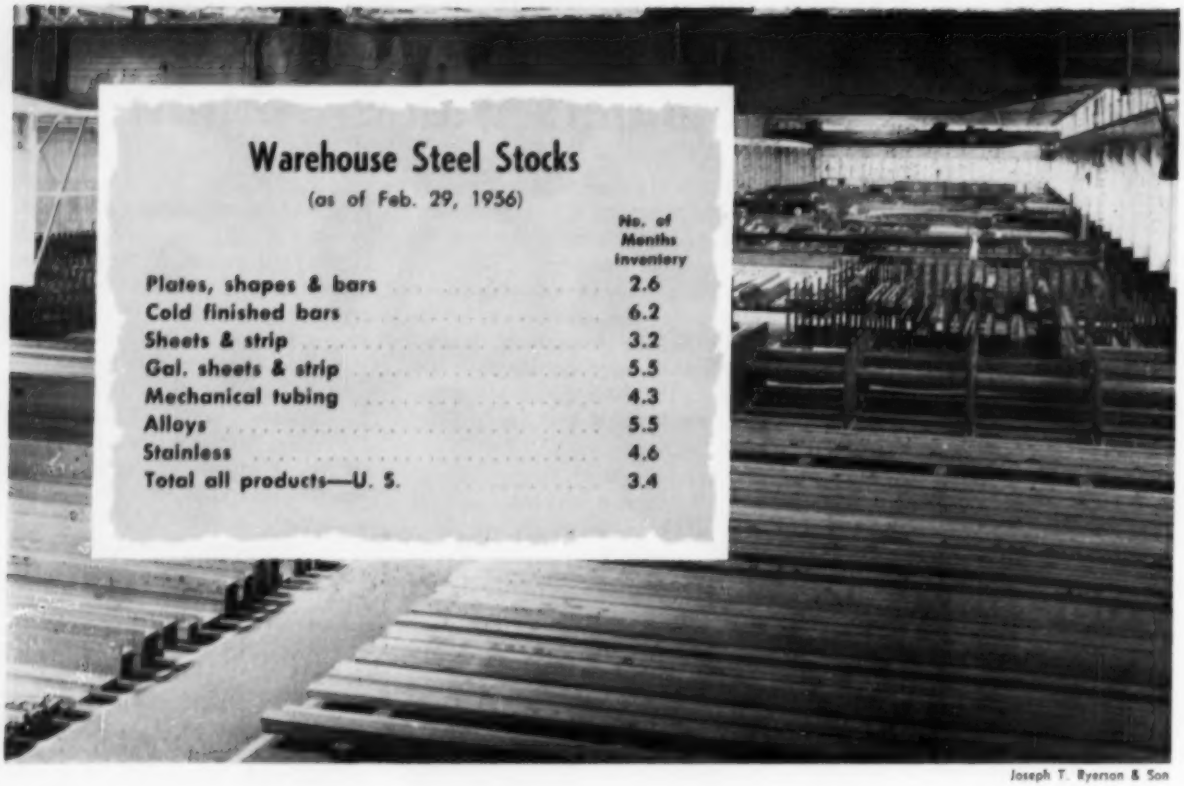
Speakers for the general session of the American Iron & Steel Institute's 64th general meeting at the Waldorf Astoria, New York, May 23-24, are: Benjamin F. Fairless, president; Max D. Howell, executive vice president; Robert S. Lynch, president, Atlantic Steel Co., Atlanta; and Joseph L. Block, president, Inland Steel Co., Chicago.

Gen. Alfred M. Gruenther will deliver the dinner address. The Charles M. Schwab Memorial Lecture will be given by Dr. Arthur H. Compton, Washington University, St. Louis.

To Ease the Engineer Shortage

Atomic reactors should be built on selected college campuses to "signalize the importance of the scientist, physicist, engineer," says Brig. Gen. David Sarnoff, chairman, Radio Corp. of America.

He also recommends: A poll to determine why so few young Americans become scientists and a National Educational Reserve of qualified teachers drawn from industry and from the retired.



Warehouse Steel Stocks

(as of Feb. 29, 1956)

	No. of Months Inventory
Plates, shapes & bars	2.6
Cold finished bars	6.2
Sheets & strip	3.2
Gal. sheets & strip	5.5
Mechanical tubing	4.3
Alloys	5.5
Stainless	4.6
Total all products—U. S.	3.4

Joseph T. Ryerson & Son

More Steel Via Warehouses?

WAREHOUSEMEN asked themselves these questions last week: 1. Will the industry keep pace with the general economic expansion and with the growth in primary steel? 2. Can we effect realistic costing practices? 3. What should our profits be? 4. What must we do to attract capable personnel? 5. Will we distribute a bigger share of steel production in the future?

Some of the answers came from speakers at the 47th annual convention of the American Steel Warehouse Association in San Francisco.

Dreaming—"We are doing a bit of dreaming today when we talk about 1975 with a steel industry producing 200 million tons of ingots, and a warehouse industry, twice its present size, shipping 30 to 35 million tons of finished steel," said Robert G. Welch, executive secretary.

Marcus J. Aurelius, vice president and general manager of sales, U. S. Steel Corp., predicted the warehouses should average 22 million tons annually by 1970. "Warehouse participation in steel distribution should increase because the increasing new mill capacity will divert more small-lot tonnage to distributors. Such orders would be uneconomical to handle at the mill level," he concluded.

Little Change — Mr. Aurelius foresees new demands and new market outlets, but he anticipates less change in product mix than might be expected. More steel will go into light flat-rolled products, and there may be a moderate fall

Jobbers' Share of 1955 Steel Shipments

Plates, shapes & bars	17%
Cold finished bars	24
Sheets & strip	11
Galvanized sheets	34
Mechanical tubing	21
Alloys	10
Stainless	27
Merchant products	34
Total all products	19 (1955)
Total all products	12 (1930)

off in plate production, rails and other heavy items.

Mr. Welch said the problem of building a bridge from a 16-million-ton warehouse business to 35 million tons in 20 years can be done if all segments of the industry contribute to the building effort. The primary steel industry, he said, can help warehouses achieve efficiency in distribution in the interest of steel as a whole.

Consumption—Mr. Aurelius reported greater population and higher average incomes will increase the need for steel. Twenty years from now the average annual demand will hit 160 million ingot tons, compared with 117 million last year. A peak production year in the 1970s would be about 200 million tons.

The far western states will show the greatest percentage gain (more than 100 per cent), but the largest tonnage increase will come in the older steelmaking states. More than half the tonnage increase will be in the middle Atlantic and midwestern states, Mr. Aurelius said.

Tomorrow—The biggest question at the convention concerned the warehouse of tomorrow. Will it be fully automated with electronic controls serving orders from start to finish? Will modern handling, cutting, burning and other equipment eliminate waste motion and labor in processing receipts and deliveries?

Paul O. Grammer, Grammer, Dempsey & Hudson Inc., Newark, N. J., was re-elected president of the association; Mr. Welch was renamed executive secretary; F. J. Heggie, A. M. Castle & Co., Chicago, and M. C. Saran, Atlantic Steel Co., Atlanta, Ga., were elected vice presidents. Other association officers were re-elected.

Next year's convention will be in New Orleans.

More Europe-Great Lakes Ships

Sixteen, 450-ft vessels in the 7000 and 10,000-ton classes are under construction or planned by the Swedish-American Line. Cost will exceed $50 million.

The ships are designed for the St. Lawrence Seaway. Swedish-American now has eight ships in Europe-Great Lakes service.

Engineering Needs Cited

MANUFACTURING engineering (including production, processes, tooling and methods) is the fastest growing engineering field, says the American Society of Tool Engineers. New types of machines, mechanization, high production operation and automatic controls are some of the reasons for the trend.

Yet, says ASTE, the number of courses offered by American engineering schools in this field is inadequate. A 1953 ASTE survey disclosed that of 142 engineering schools only 36 offered 25 or more credit hours in tool and production engineering subjects. Some of the schools offered none.

Survey—Over 2000 mechanical and industrial engineering graduates were recently surveyed by ASTE. Alumni of the classes of 1950, 1951 and 1952 were chosen as representative of graduates who had completed industry training programs and had been assigned permanent positions.

Schools included: Lehigh University, University of Michigan, Purdue University, University of Tennessee and University of Texas. Graduates were asked to name their major field of work (see table.)

Check—Also surveyed as a double check were 318 metalworking companies. The firms were asked the positions held by 1952 graduates in their organizations.

The two surveys generally agreed with each other, although the percentages of graduates in manufacturing engineering and product design were higher in the metalworking survey (27.2 per cent and 24.3 per cent, compared with 25.5 per cent and 17 per cent in the school survey).

Other Fields—Sales and administration work took their toll of engineers available for manufacturing. Graduates in the school survey engaged in those fields totaled about 21 per cent, while the industry survey showed about 14 per cent were in sales (administration was not a category in the industry survey). The heat-power field, traditional academic favorites, lagged far behind.

Graduates had their own ideas about what courses should be offered in schools to better prepare them for their careers. Highest on the list of wanted subjects were social science and English. About one in ten requested courses in manufacturing processes.

Where Engineering Graduates Go

(Jobs held by 2278)

Manufacturing Engineering	25.5%
Product Design	17.0
Sales	12.5
Research	10.8
Maintenance	8.7
Administration	8.6
Heat-Power	5.5
Other	11.4

Source: American Society of Tool Engineers

Ford Motor Co.

Farm Sales Dip: Output Cut

THE FARMER will be a better metalworking customer next year if pending farm legislation is enacted — and all signs say this second farm bill will be. Legislation already passed by the House (314 to 78), and now being worked over in the Senate, plus other measures being taken to bolster sagging farm income, will mean almost $2 billion a year to the nation's farmers.

Certain Dip — But the action comes too late to prevent an almost certain dip in farm equipment sales this year. How big? E. H. Woods, general sales manager, Tractor & Implement Division, Ford Motor Co., says: "An extremely late spring and other weather conditions have had a depressing effect on farm equipment sales. It remains to be seen how severe that effect will be or if a period of good weather will reverse it."

Other experts say the dip could be as much as 20 per cent from 1955's $1.9 billion. That would put sales barely on a level with admittedly poor 1954. They point out that the usual big buying time (February, March and April), which accounts for some 60 per cent of equipment sales, is past in the corn belt; that several producers have already cut back production schedules. Tight credit and the status of farm debt are also downward influences.

Balances—On the plus side: 1. The psychological effect of better income prospects on farmers. 2. The possibility that dealers have kept inventories at a minimum anticipating farmers' reluctance to buy; prospects of a price rise following steel negotiations could start them building stocks. 3. A growing replacement market which accounts for more than half of farm machinery sold. 4. The big buying season in some southern sections of the country is the fall.

Comments Robert S. Stevenson, president, Allis-Chalmers Mfg. Co.: "Even though this is not a good year for farm equipment sales, we are not gloomy about agriculture's future. The farmer's basic financial condition is still sound, and we believe his lot will improve."

Backing that up: Major retooling is planned this year by Allis-Chalmers' farm equipment division.

Atomic Notes

Permits for construction of two full-scale atomic power plants by private firms have been approved by the Atomic Energy Commission. Consolidated Edison Co. plans a $55-million plant (not including cost of land and transmission equipment). It will use nuclear and conventional fuels in combination to generate 236,000 kw. Babcock & Wilcox Co. will do the design and construction work; completion is set for Oct. 1, 1960.

Commonwealth Edison Co. plans a $45-million plant of 180,000 kw capacity. Design and construction of the reactor will be done by General Electric Co., with Bechtel Corp. as engineering-constructor for GE.

Babcock & Wilcox will design, fabricate and operate a liquid metal fueled reactor experiment for the Atomic Energy Commission if an acceptable contract can be negotiated. Union Carbide Nuclear Co. reportedly will be a major subcontractor.

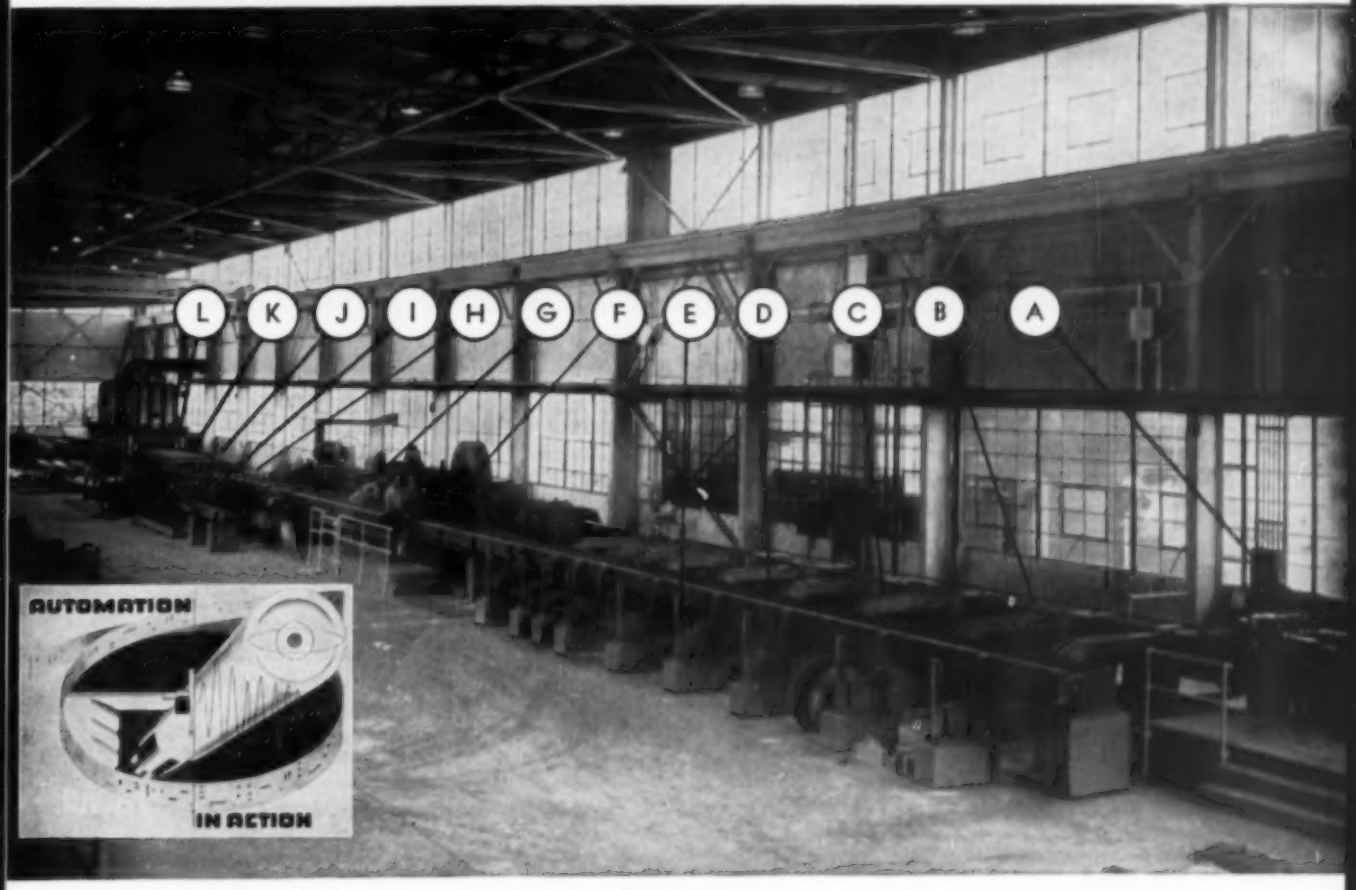
Here's the Fastest, Most Efficient Cold Draw Processing Line Available

The McKay Automated Line that automatically handles and processes hot rolled bars through cold drawing, shearing and straightening in a continuous cycle has proved itself to be far and away the fastest, most efficient cold draw processing operation in action today. Users are finding they can effect great labor savings while actually boosting production, and at the same time get a more uniform product.

Hot rolled, pickled bars are push pointed, drawn, sheared to length, and straightened in a single, continuous operation with no intermediate handling of any type. Hold down and crop gauging on a multiple shear, plus automatic length gauging, permits the shearing operation to keep pace with the maximum drawing cycle. Sheared bars are automatically entered into the straightener which operates at speeds high enough to enable a continuous straight-line flow of bars.

Does the line pay off? Three of four companies now using these lines say they have already paid for themselves and are contemplating the purchase of additional units.

CAN YOU AFFORD TO OPERATE WITHOUT SUCH COST SAVING EQUIPMENT? Remember handling adds nothing to the value of your product. Why not look over the McKay line of automated processing-handling equipment? Why not talk it over with a McKay engineer? There's no obligation.



A—**Hydraulic Push Pointer** Eliminates pointing prior to drawing. Minimizes point scrap.

B—**Multiple Bar Draw Bench** One, two or three bars at a time.

C—**Horizontal Pneumatic Transfer Arms** Takes drawn bars from bench and deposits them on driven shear entry table.

D—**Shear Entry Table** Conveys drawn bars to the shear.

E—**Auxiliary Racks**

F—**Multiple Bar Shear** Has capacity to shear same number and sizes of bars that are drawn.

G—**Cut-to-Length Gauge Table** Automatic cut-to-length and crop gauges.

H—**Shear Run-out Table** Driven table conveys sheared bars to straightener entry table.

I—**Transfer Skids** Entry to straightener table.

J—**Automatic Straightener Entry Table** Completely automatic feed from transfer skids into straightener.

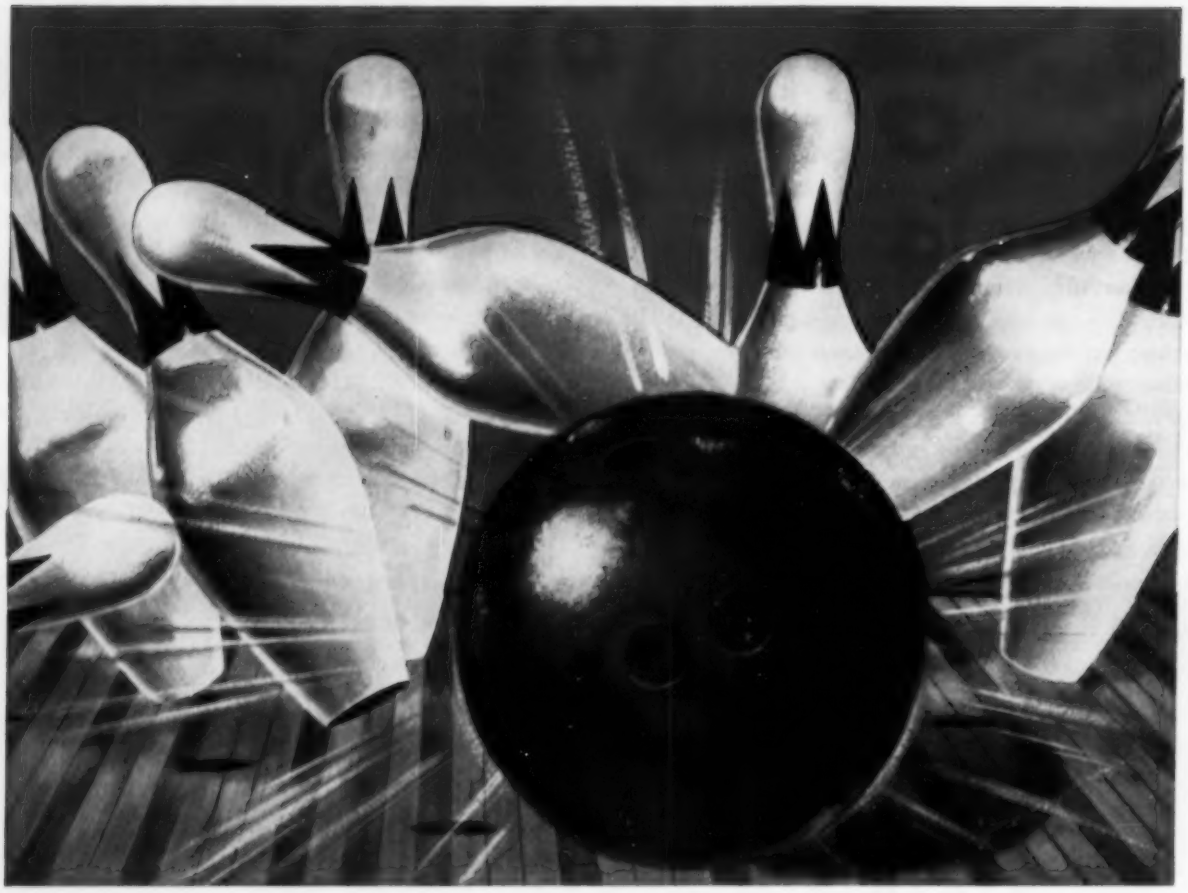
K—**Straightener**

L—**Straightener Exit Table and Racks**

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES



"Finish first in your league"
...with J&L 1200 COLD FINISHED STEELS

When your machining applications require a steel that's tops in quality, machinability, uniformity and surface finish—"J&L 1200" Cold Finished Steel is the answer. It's one of a complete line of premium quality, free-machining bar steels developed over the years by J&L specialists. Thus, we can recommend the right type to help solve your problems.

Operators in shop after shop around the country using "J&L 1200" report:

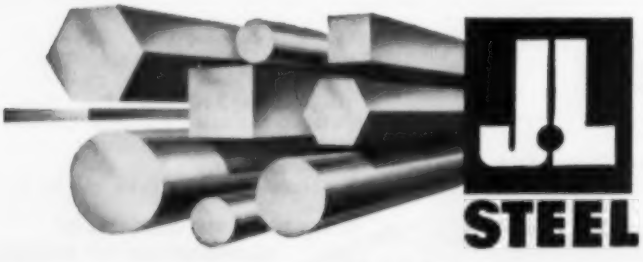
- **Better machine finishes**
- **Improved tool life**
- **Increased machining speeds**
- **Greater uniformity**

"J&L 1200" grades, available in all standard shapes and sizes, meet the compositions published by the American Iron & Steel Institute (AISI C-1213) . . . Society of Automotive Engineers (SAE 1113) . . . and Federal Specification QQS-633.

Use this steel in your own shop to secure better work at lower over-all costs. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.

Adequate stocks of all J&L cold finished free-machining steels are available in important industrial centers. Phone the nearest J&L District Office or your Distributor today for prompt and efficient service.

Pick the Free-Machining Steel that serves you best—from J&L's complete Cold Finished Line



Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

COLD FINISHING PLANTS AT PITTSBURGH, PA., AND HAMMOND, IND.

Reed's Grundy: Toolmaker for Oil

"QUALITY is what keeps us in business."

As newly appointed factory manager for Reed Roller Bit Co., Houston, Jack Grundy's job can be stated simply: Turn out quality that will sell. But those few words do not spell out his responsibilities. He oversees the operation of manufacturing facilities, maintenance, tool design, time study, quality control, material control and purchasing.

Quick Test—Quality in the oil drilling tool business is no halfway affair. As he points out: "Everything we make goes into the well. A bit is used to destruction within 24 hours. The customer doesn't have to guess about the quality of the tools he's using.

"What magnifies the trouble is that if the tools fail, the driller may lose not only the $200-or-so bit, but the whole well. He may have several hundred thousand dollars tied up in it."

Automation—Mr. Grundy is sure part of the answer to better and more consistent quality lies in automation. "Not the Detroit-type of automation, but certainly more single, special-purpose machines with completely automatic cycles."

His firm's new flash-welding plant is a good example. Tool joints are welded to long sections of drill pipe in a huge flash welding machine. The operation used to be done by hand. Bulky pipe sections were hoisted hither and yon while necessary operations were completed.

Now, all pipe is moved automatically around the plant on a power conveyor. Manipulators bring the pipe into position for belt grinding, welding, normalizing, boring, etc. Both production and weld consistency are up.

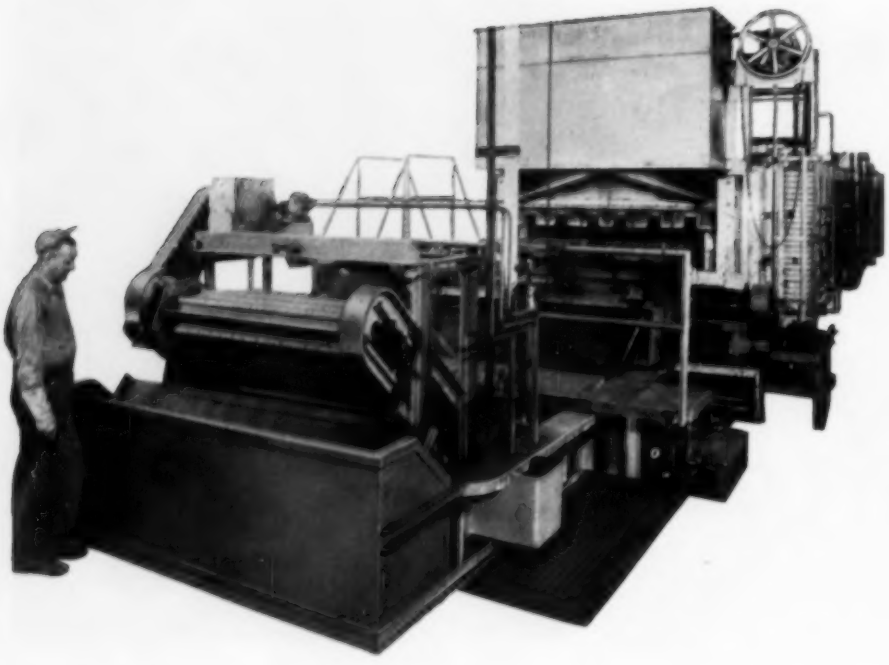
Better at Start—"We also have a continuous program to tighten and improve our material specifications. End-product quality is directly related to the character of materials we buy.

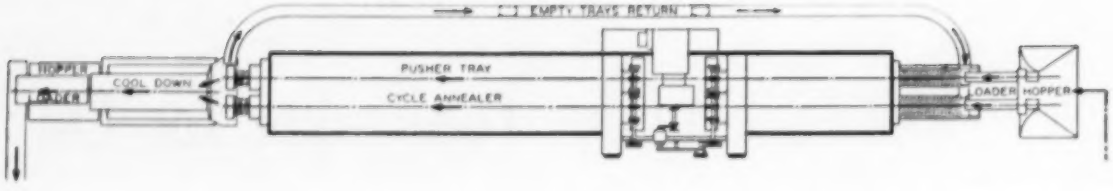
"Look at it this way. If the driller wants to sink an 8¾-in. hole, there's little we can do to beef up the 8¾-in. bit. Any improvement must come out of better materials, perfected heat treatment and closer tolerances."

Precision—It's a common misconception that there's little precision required in a tool that's going to dig a hole in the ground. "When you put 60,000 to 70,000 lb on a 7⅞-in. drill, it's no place for sloppy fits. Poor size control will cause bearings to fail, shattering the bit . . . and there goes another customer."

A mechanical engineer from Texas Technological College, Mr. Grundy was graduated in 1935. He has been with Reed since 1939. Starting as a draftsman, he worked as purchasing agent, production manager, materials manager and assistant factory manager.

He's a native of Texas, is married and has a daughter, 15, and a son, 13. His hobbies: Fishing, and bird hunting.





This 'Surface' automatic cycle annealer operates at the rate of 2,000 lbs/hr, isothermally annealing forgings of SAE 8717H, 1117, and 1137 steels.

Automatic cycle annealing repays Marion Division 4 ways

(1) Faster production, (2) product uniformity, (3) reduced machining time, and (4) reduced handling have more than repaid the Dana Corporation, Marion Division, since they installed 'Surface' automatic cycle annealing equipment.

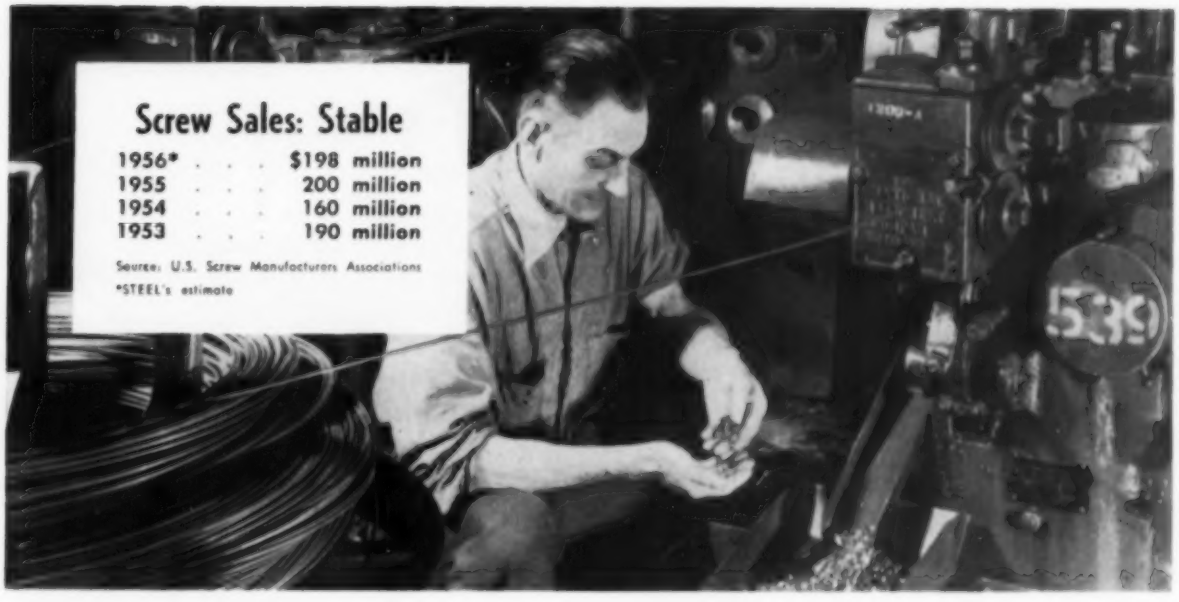
Their cycle of heating-soaking-fast-cool-holding-fast-cool is about twice as fast as conventional annealing. At the same time, it provides exceptional control of metal structure, and results in better machinability. Furnace mechanization precisely regulates work time in each zone of the cycle, and can be varied to suit the steel.

Automatic loading and unloading provide smooth, straight-through operation and cut handling costs. Why not ask 'Surface' to help you apply these advantages to your own annealing operations?

Send for Bulletin SC-146 • Surface Combustion Corp., 2385 Dorr St., Toledo 1, Ohio

Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO
Also makers of Janitrol® automatic space heating and Kathabar® humidity conditioning units


Screw Sales: Stable
1956* . . . $198 million
1955 . . . 200 million
1954 . . . 160 million
1953 . . . 190 million
Source: U.S. Screw Manufacturers Associations
*STEEL's estimate

Screwmakers Cautious

The industry anticipates no great increase in sales before the 1957-model autos go into production, but feels the fiscal year will end satisfactorily

SCREWMAKERS are hoping their industry's dollar sales will equal last year's estimated $200 million, reports George P. Byrne Sr., managing director, sheet metal, wood and capscrew statistical bureaus, New York.

Many of the 90 companies which manufacture machine, wood, cap, set, socket and other metal screws indicate sales have dropped 10 to 15 per cent so far this year.

Automotive—B. L. Norton, president and treasurer, Federal Screw Works, Detroit, points out demand for screw products diminished substantially and quickly during March because of reduced auto production.

This feeling is echoed by Carl C. Kamphausen, executive vice president, Allied Products Corp., Detroit, who says: "Everybody is singing the blues. We're down about 40 per cent." Mr. Kamphausen feels that sales should start climbing in August.

Contrast—More on the optimistic side, William E. Ylvisaker, general manager, standards division, Pheoll Mfg. Co., Chicago, reports: "We expect our 1956 business to be 15 per cent above 1955's, according to present indications." The majority of Pheoll's customers are in the appliance, aircraft and construction fields—all are having a good year.

D. P. Wertheimer, sales manager, Sterling Bolt Co., Chicago, agrees. He says: "Sales in 1955 were up between 10 and 15 per cent over 1954's. Sales to date are up another 10 per cent, and we're hoping the trend will continue."

Sterling sells to farm equipment makers, machinery builders and the appliance industry. Appliance market has been strongest.

Competition — Mr. Byrne indicates that competition is extremely brisk. The number of manufacturers has increased in the last ten years, and the industry has been hard hit by imports from countries whose labor rates are one-third to one-tenth lower than U. S. rates.

Markets—Demand varies from year to year, but generally few markets have been lost to other types of fasteners. Richard Belford, treasurer, Industrial Fasteners Institute, Cleveland, says that plastic screws don't compete with metal screws pricewise, but are designed for a specific job.

But E. O. Pracegus, assistant sales manager, Atlas Bolt & Screw Co., Cleveland, adds: "Many makers of cold-headed screws are getting into the market for screw machine products. We may soon be feeling competition from sheet metal screws made on a punch press. There even are rumors that powdered metal screws are not too far away."

Ceramic screws are under development, too.

Standardization — Perhaps the biggest boon to screwmakers is a growing realization of the importance of standardization in their product lines. (See STEEL: Aug. 29, 1955, p. 100).

They are selling customers on the idea of making one screw work in several applications. This leads to lower costs and increased production efficiency.

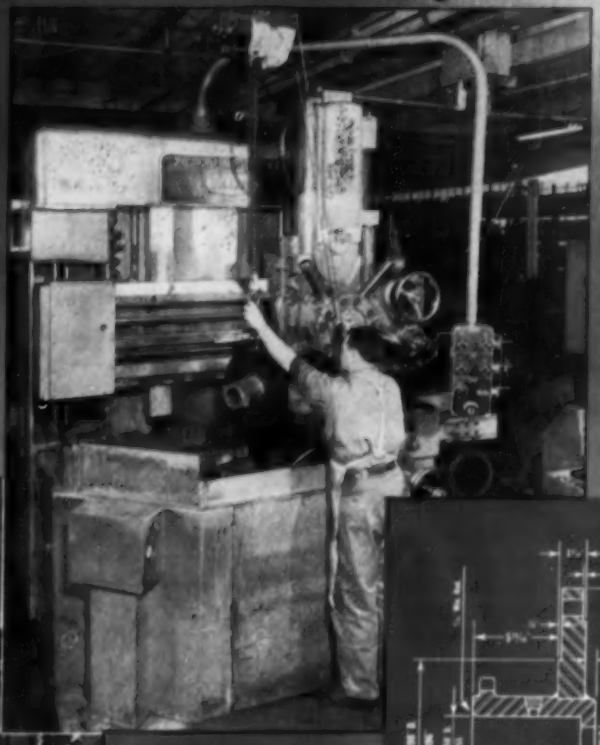
Special screw needs still can be filled by small companies with only a few machines. Some of the larger companies are eying such special orders as potential areas for diversification.

NEW BULLARD

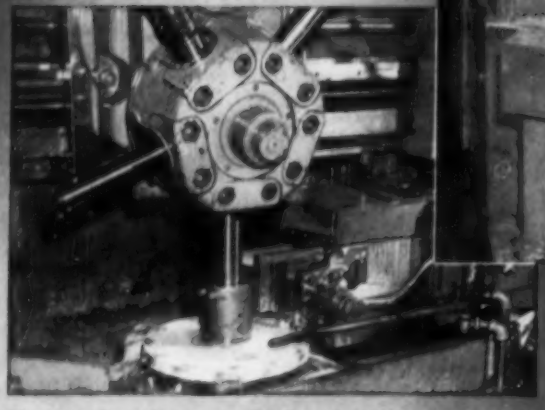
CUT MASTER V.T.L.

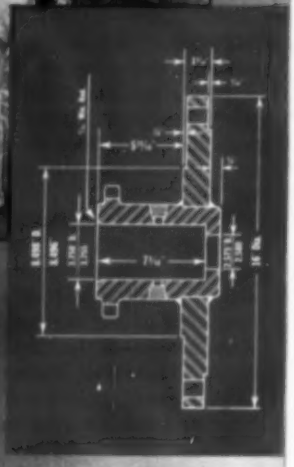
MODEL 75

25% reduction in machining time



Manufacturers of fluid mixing equipment for numerous applications in industry, Mixing Equipment Co., Inc., Rochester, New York, are enthusiastic in their acclaim of the performance of their new 26" Cut Master, Model 75.





Easier loading and chucking, greater capacity and accuracy, combined with ease of operation are the factors contributing to the increase in production according to Mr. Walter Schmidt, General Foreman.

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

Are you interested in applying these advantages to your manufacturing processes? If so, call your nearest Bullard Representative or mail coupon to

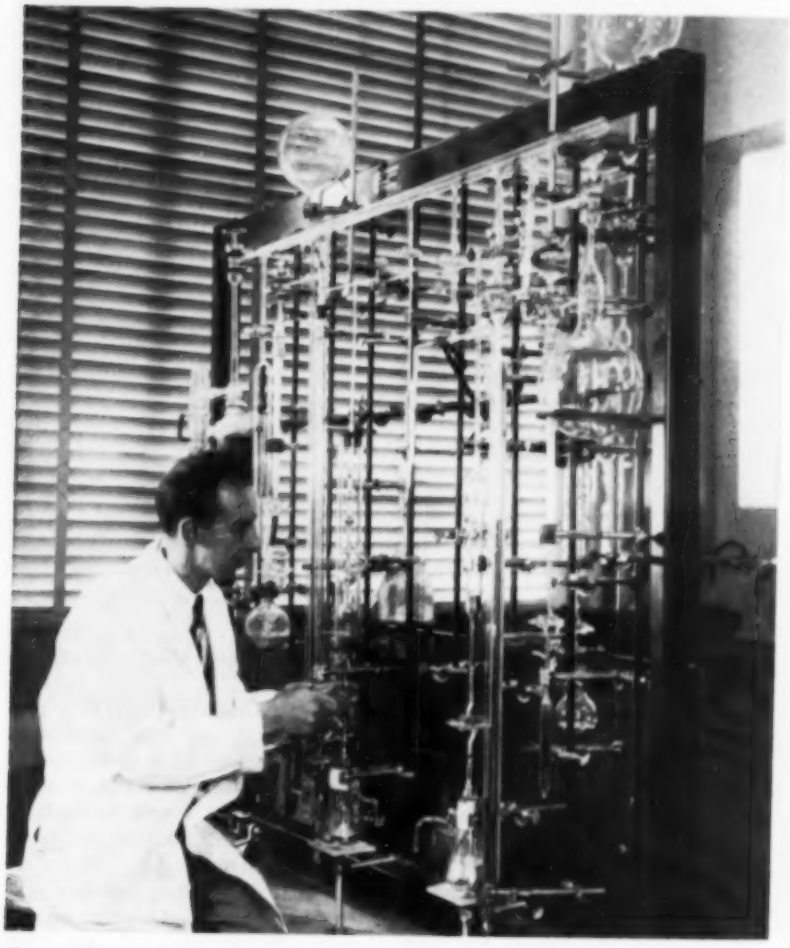
THE BULLARD COMPANY
286 CANFIELD AVENUE — BRIDGEPORT 9, CONNECTICUT
Please send me a copy of the
NEW CUT MASTER V.T.L., MODEL 75 CATALOG

NAME _____

COMPANY _____ POSITION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____



By speeding molecules through the maze of glass and observing how many hop on surfaces of fine powders, Chrysler learns how to make things stick better

Chrysler's Research Pays

Here's how the company organizes research, the kinds of problems its scientists work on, the types of answers it seeks and the results it gets

HOW DO you stop paint from chipping off Plymouth hubcaps? What does wear do to automotive parts? What happens in the corrosion process before its telltale signs can be seen? Why do auto stop lights sometimes stay on after the brake has been released? What will cars be like in 1960? How can nuclear energy be used in auto production?

Answers—Those are just a few of the questions engaging the attention of some 320 scientists and engineers at Chrysler Corp. The company has had an active research organization for 30 years, longer than Ford or General Motors. Most of the research laboratories are housed in Chrysler's engineering center at Detroit.

"Our research section is charged with three areas of responsibility," says George J. Huebner Jr., executive engineer in charge of research. They are: 1. Research on advanced ideas and techniques related to final products, plus the collection of background knowledge which aids further research. 2. The study and development of products which can be integrated within the corporation. 3. Study and development of products and services for diversification.

Structure — The framework to carry out these aims is indicated by James W. Furlong, who is in charge of research administration. He explains that the groups are broken into basic research services, mechanical research and nuclear research.

"Most production problems do not come to research unless a division needs our special equipment," says Mr. Furlong. But the lab people are highly skilled trouble shooters. A good example of their detective work turned up recently in the case of the chipped paint.

Sleuths — Production engineers found paint was chipping off Plymouth hubcaps. They asked research chemists to pinpoint the trouble.

Analysis of a degreasing bath disclosed a chemical agent which filmed the hubcaps just enough to make paint flake off rapidly. Working with that knowledge, production men found paint sprayers were cleaning their filter masks by swishing them in the degreasing bath. The trouble was quickly cured.

Exception—This case is an exception. Usually, the laboratories are working far ahead of current model production. This is particularly true in basic research. This section is composed of metallurgical, chemical and physics departments. Results of their experiments will be seen on future automobiles.

Dr. Walter E. Jominy, chief research metallurgist, asserts: "Versatility is the keynote of all our

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

metallurgical research. We have facilities to do whatever we think we may think of."

Miniature — The metallurgical labs have a completely equipped, pint-size foundry, a miniature rolling mill, carbon restoration and vacuum brazing furnaces. They can make their own clad steels and are doing a lot of precision molding of gas turbine blades. One of the big projects is the study of wear.

Chemistry — Dr. D. M. Teague, assistant head of the chemical research department, points out projects in electro, organic and inorganic chemistry.

The electrochemical section is developing new ways to find out what happens early in the corrosion process. David Collins, research chemist, asserts: "It's basic research, but the tests can help us find new metals or better coatings for materials now used in automobiles."

Physics—"One of the big problems in all our work is making instruments to measure what we're doing," says Dr. A. P. Loeber, head of physics research. This department has just set up a separate research-instrumentation laboratory under the direction of James A. Lunan.

Even before the group was organized, Dr. Loeber and Mr. Lunan devised techniques to find out what made automobile stop lights stay on after the brakes were released.

Tracers — The physicists used radioactive tracers to discover that a minute amount of metal transfer took place when stop light switch contacts were made and broken. "We finally found different metals to do the job. Two of them turned out to be cheaper than the ones we were using," reports Dr. Loeber. Results: Nonsticking stop lights and a cost saving in parts.

These are just a few examples of what goes on in Chrysler's research laboratories. Mechanical research engineers carry out experiments leading toward new or better product designs. Chrysler also was among the first of the automobile companies to do nuclear research. Its ultimate aim is to find more industrial uses for nuclear energy.

Oak Ridge atoms are used in Chrysler labs

Production Report

Chrysler is accounting for about 14.5 per cent of total auto production, according to *Ward's Automotive Reports*. Ford's share is 25.3 per cent. GM is producing 55.4 per cent.

Ward's indicates that May production will continue to decline. It predicts second quarter output at about 1.6 million units, 24.4 per cent below last year's 2.1 million.

Auto makers are beginning to believe they may have been too optimistic in predicting that this year would be the second highest on record. Feeling now is that 1956 model cleanups will tell the story. Chances are that every effort will be made to bring out '57 cars as early as possible. It still doesn't seem likely that any models can be introduced before mid-August —probably not that soon.

Packard Rumors

Latest talk about Studebaker-Packard Corp.: Although tooling orders are out for '57 models, work is being held up, pending the usual one-third down payment for tooling costs.

A major change for Packard (along the Predictor dream-car lines) has been scheduled. If the company can't come up with a down payment on tooling, it might have to make do with a facelift.

In either case, it seems likely Packard will be among the last cars out. Some rumors place introduction dates in January, 1957.

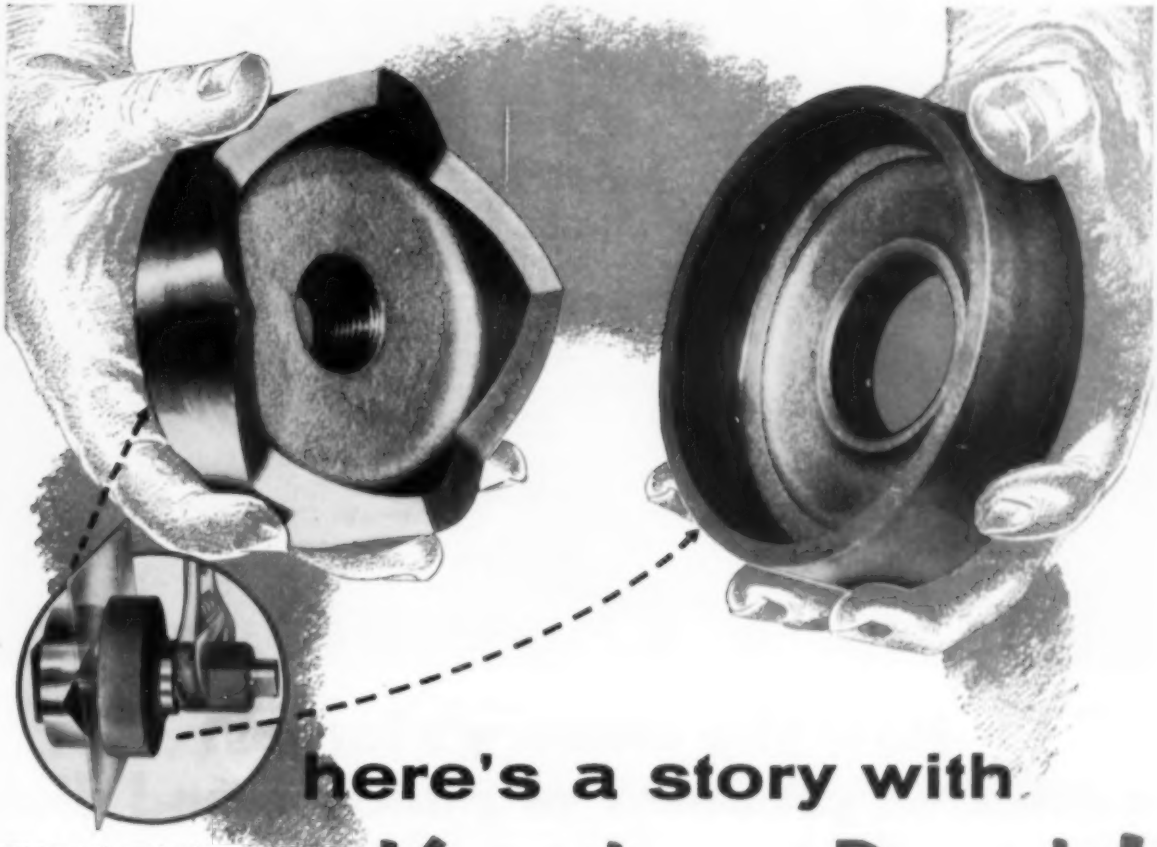
U. S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,801	674,951
March	575,530	792,436
April	754,077†	752,245
4 Mo. Total	2,495,598	2,879,140
May		723,868
June		648,412
July		658,696
August		613,705
September		460,443
October		517,788
November		749,061
December		682,256
Total		7,933,369

Week Ended	1956	1955
Apr. 7	133,354	168,002
Apr. 14	136,038	175,133
Apr. 21	129,930	180,647
Apr. 28	127,277	184,279
May 5	114,750†	172,031
May 12	114,000*	177,287

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL



This is one of many knockout punches and cutters manufactured by Greenlee Tool Co., Rockford, Ill.

here's a story with a Knockout Punch!

A Tool Manufacturer Made Drastic Reduction in Production Costs by Using a Copperweld Leaded Alloy

Knockout punches involve turning, drilling, milling and grinding. When the Greenlee Tool Co. switched to a leaded alloy their spindle RPM increased 30%, their tool feed from .005" IPR to .009" IPR—ID hogging could now be done with only one tool. Tools lasted nearly 10 times as long using leaded alloy. This is another case of cutting production cost by using steel with "built-in productivity."

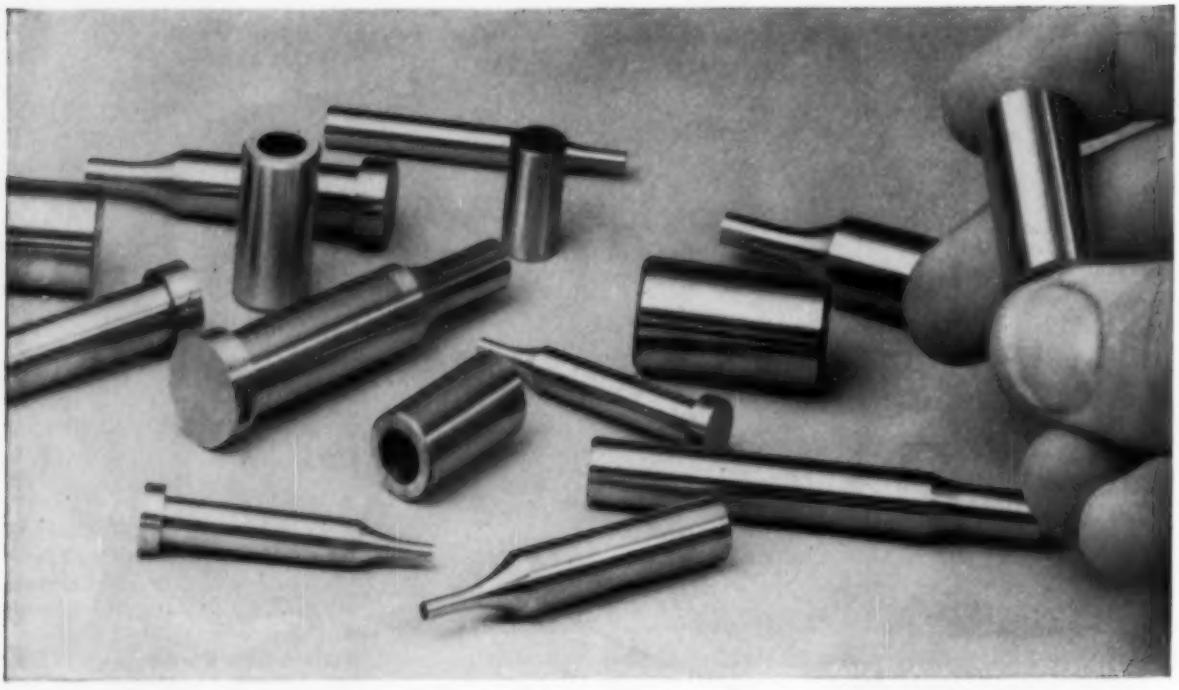
Freer feeds and speeds and longer tool life can be yours if you switch to Copperweld Leaded Alloys.

For further details, write for free booklet, "Lead Treated Steels"

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.



How the country's largest exclusive producer of punches and dies changed complaints to contracts

. . . with Graph-Mo® steel

PORTER Precision Products, Cincinnati, Ohio, is the country's largest exclusive manufacturer of punches and dies—37,000 different sizes in stock. Formerly, Porter produced these products from water-hardening and other high-carbon tool steels, but found that such steels presented distinct disadvantages. For example, they distorted in heat treating, were relatively expensive and difficult to machine, and did not meet customers' demands for longer life.

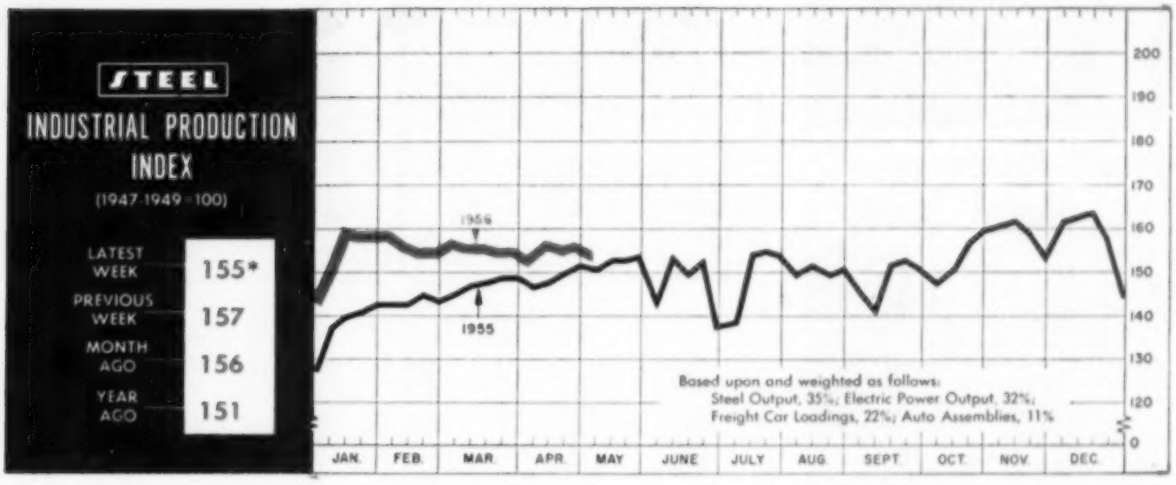
With a view to correcting these problems, Porter engineers adopted Graph-Mo®—one of four graphitic tool steels developed by the Timken Company—as a standard for the manufacture of punches and die buttons. Because it contains free graphite, Graph-Mo is easier to machine. And punches and dies made of Graph-Mo don't scuff or gall. From every aspect, Porter's adoption of Graph-Mo steel has proved eminently successful.

Graph-Mo outwears ordinary tool steels on an average of three to one. Millions of tiny particles of diamond-hard carbide—one of the most wear-resistant substances known—give Graph-Mo steel longer service life.

Graph-Mo may be the solution *to your* punch and die problems. For more information about all four graphitic steels developed by the Timken Company, and their uses in dies, punches, gages, and machine parts, write for the new Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended May 5

Second Quarter: Carbon Copy of First

METALWORKING'S second quarter should show up about even Stephen with its first quarter, but it's in a vulnerable position—notably from the direction of the automotive and steel industries.

Despite all efforts to pare the dealer stocks of new cars, auto producers have failed to bring them beneath the 40-day level. This means further cutbacks may be ordered, wiping out the year's low mark set for the week ended May 5. According to *Ward's Automotive Reports*, motordom put together only 137,040 cars and trucks that week. While Detroit does not control the economy, the auto industry is one of the most important factors from any point of view and cannot be ignored.

Strike Situation—As for the steel industry, it's a safe bet there will be wildcats from now until the big negotiations come up in June. This will cut down the operating rate, as it did in the week ended May 6 and again last week, according to American Iron & Steel Institute figures. Production fell beneath 2.4 million net tons for the first time this year. While strikes will affect industrial production, they should not be considered an omen of a weakness in general business.

Backlogs in metal consuming industries assure us of continued good business in 1956 if the materials are available. Typical backlogs are these: Dresser Industries, $69 million, more than double those of a year ago; Rockwell Mfg. Co., about double a year ago; Merritt-Chapman & Scott Corp., $466.8 million, compared with $262 million last year; Parker Appliance Co., $10.2 million, an increase of $2.1 million in the last three months; Worthington Corp., $67 million vs. $50 million a year ago; American Brake Shoe Co., $49.7 million against $42.6 million at the end of 1955. Respondents to a survey conducted by the Purchasing Agents Association of Chicago report a slight increase in backlogs for April—30 per cent, compared with 27 per cent in March.

Verification—The Office of Busi-

BAROMETERS OF BUSINESS

	(LATEST PERIOD*)	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,375	2,373	2,345
Electric Power Distributed (million kw-hr)	10,875[1]	10,867	9,586
Bituminous Coal Output (1000 tons)	10,155[1]	10,050	8,563
Petroleum Production (daily avg—1000 bbl)	7,140[1]	7,146	6,688
Construction Volume (*ENR*—millions)	$389.0	$526.0	$389.4
Auto, Truck Output, U. S., Canada (*Ward's*)	151,366[1]	163,224	215,756
TRADE			
Freight Car Loadings (1000 cars)	765[1]	778	741
Business Failures (Dun & Bradstreet)	245[1]	236	237
Currency in Circulation (millions)[3]	$30,181	$30,155	$29,764
Dept. Store Sales (changes from year ago)[3]	−2%	+1%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,240	$21,137	$21,939
Federal Gross Debt (billions)	$275.7	$276.0	$276.7
Bond Volume, NYSE (millions)	$21.0	$21.5	$19.1
Stocks Sales, NYSE (thousands of shares)	13,184	12,610	11,567
Loans and Investments (billions)[4]	$85.3	$85.5	$84.8
U. S. Govt. Obligations Held (billions)[4]	$27.5	$27.7	$34.0
PRICES			
STEEL's Finished Steel Price Index[5]	210.45	209.10	194.53
STEEL's Nonferrous Metal Price Index[6]	277.1	277.9	237.0
All Commodities[7]	113.8	113.7	110.4
Commodities Other Than Farm & Foods[7]	121.4	121.4	115.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,853; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

DIAMOND PERFORATED METALS

Need Holes in Metal Sheets?

Several considerations must usually be observed. The design should be attractive in appearance and the percentage of open area should be adequate while, at the same time, affording suitable concealment of what lies behind or underneath. Naturally, also, the right metal should be used in the right thickness.

Whenever Perforated Metal is required, and it has thousands of applications today, you'll do well to contact Diamond. Forty years of widely diversified experience and hundreds of modern tool arrangements enable us to give unsurpassed service and delivery. Catalog 39 (32 large pages) gives complete illustrated information. No charge or obligation.

DIAMOND MANUFACTURING CO.
Box 32 WYOMING (Wilkes-Barre Area) PENNA.

they all know the best place in Cleveland

"Hotel Cleveland, sir?"

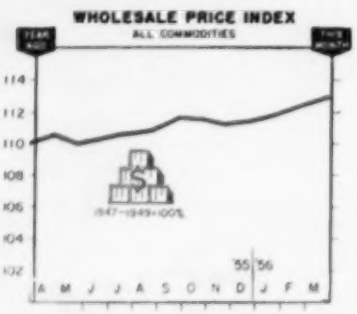
Whether you arrive by plane, train or car, the friendliest place to stay is Hotel Cleveland, where airport limousines make their first stop.

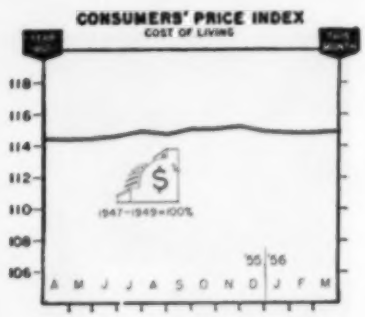
No room charge for children under 14 when registered with an adult.

Hotel Cleveland

SONNABEND OPERATED HOTELS
Distinguished American Landmarks
CHICAGO: Edgewater Beach Hotel
BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

THE BUSINESS TREND





	1956	1955	1954
Jan.	119.9	110.1	110.9
Feb.	112.4	110.4	110.5
Mar.	112.8*	110.0	110.5
Apr.	....	110.5	111.0
May	....	109.9	110.9
June	....	110.3	110.0
July	....	110.5	110.4
Aug.	....	110.9	110.5
Sept.	....	111.7	110.0
Oct.	....	111.6	109.7
Nov.	....	111.2	110.0
Dec.	....	111.4	109.5

U. S. Bureau of Labor Statistics
*Preliminary

	1956	1955	1954
Jan.	114.6	114.3	115.2
Feb.	114.6	114.3	115.0
Mar.	114.7	114.3	114.8
Apr.	....	114.2	114.6
May	....	114.2	115.0
June	....	114.4	115.1
July	....	114.7	115.2
Aug.	....	114.5	115.0
Sept.	....	114.9	114.7
Oct.	....	114.9	114.5
Nov.	....	115.0	114.6
Dec.	....	114.7	114.3

U. S. Bureau of Labor Statistics

Charts copyrighted, 1956, STEEL

ness Economics, Department of Commerce, says that unfilled orders in March totaled $57.2 billion, up slightly from February. The entire increase was accounted for by the durable goods industries. Inventories also increased to a new high of $47.6 billion ($47.4 billion seasonally adjusted). To many who compare this with the level of 1953—or even 1949—this spells a rolling adjustment. Others point out that our economy is bigger now than it was then, and to make more things requires more inventory. Our economy is dynamic enough to shake off any serious effects of an inventory adjustment, they say. Besides, new orders are still at a high enough level to warrant a good measure of business confidence.

Index Remains Stable

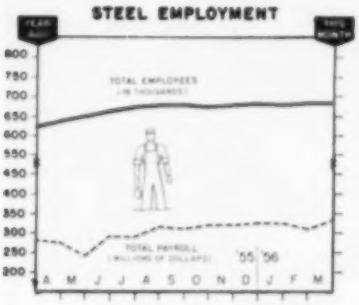
STEEL's industrial production index illustrates this flexible characteristic of the economy. So far this year, it has fluctuated within a narrow range of 9 points despite the worst that automotive dips could do to it. For the week ended May 5, it stood at 155 (1947-1949=100). The weekly average so far in 1956 is 156.5, compared with 144.7 for the corresponding period last year. Fourth quarter, 1955, averaged 156.7.

Costs To Continue Up

The cost picture is not so encouraging. Consumer prices, held in check since last November, advanced to 114.7 (1947-1949=100), according to the U. S. Bureau of Labor Statistics. Wholesale prices have followed a continuous course upward since October, resting at 112.8 (1947-1949=100) for March (see charts above). Both trends are destined to continue. Raw materials are costlier—Chicago purchasing agents say they are tapering off at a high level, while Cleveland purchasers indicate the rise is continuous. Farmers are beginning to get more for their products—5 per cent more in April than in January. Some of these increases are being passed on to the consumers. And the big round of wage increases—and subsequent price increases—is still ahead!

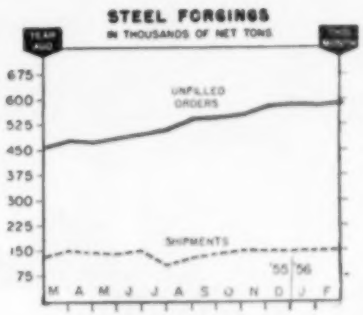
Personal Income Rises

But there is plenty of money around to buy the more expensive goods. The Office of Business Economics reports that personal in-



	Employment in Thousands 1956	1955	Payroll in Millions 1956	1955
Jan.	681	605	$329.1	$258.8
Feb.	684	616	317.3	255.1
Mar.	685	630	338.1	288.2
Apr.	...	643	...	282.0
May	...	654	...	249.1
June	...	667	...	298.4
July	...	676	...	296.8
Aug.	...	680	...	320.7
Sept.	...	680	...	317.1
Oct.	...	678	...	325.1
Nov.	...	680	...	326.1
Dec.	...	682	...	330.6

American Iron & Steel Institute



	Shipments 1956	1955	Unfilled Orders 1956	1955
Jan.	160	136	589	453
Feb.	152	135	599	460
Mar.	...	154	...	479
Apr.	...	150	...	475
May	...	147	...	488
June	...	155	...	501
July	...	115	...	513
Aug.	...	135	...	547
Sept.	...	149	...	552
Oct.	...	158	...	560
Nov.	...	158	...	585
Dec.	...	158	...	592

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more

come in March was at the annual rate of $315 billion, up $1.5 billion from February. The main cause was the boost in the minimum wage law, which showed up for the first time in March. But full employment helped. Only 2 million man-days were lost because of strikes, compared with 2.2 million in shorter February. The March take-home pay of factory production workers set a new high for the month, too. Net spendable weekly earnings of a worker with three dependents were $72.10, says the Bureau of Labor Statistics.

In the steel industry, monthly and quarterly payroll records were set, says American Iron & Steel Institute (see chart above). The payroll came to $338,140,000 in March, about $7.5 million more than the previous record set last December. Employment rose to 685,200, or 56,000 more than March last year. Both records could be exceeded many times before the year is out—especially the payroll. Employment will stay at its high level until negotiations time, then drop off during the summer. But it will rise again in the fourth quarter. C. M. White, president of Republic Steel Corp., told stockholders last week that steel operations will take the customary dip during the summer quarter, but they will come back strong in the last quarter and carry over into 1957. He does not believe the steel inventory situation is too serious.

Consumer Credit Expands

Installment credit rose to $27,964 million by the end of March, $180 million greater than the month before, according to the Federal Reserve Board. While this worries some economists—notably the FRB's—it should be viewed in its proper perspective, says Arthur O. Dietz, president of C.I.T. Financial Corp. "Over half of our families now qualify as members of the middle-income groups and have the means and the desire to employ installment credit," he says. In addition: The consumer used to pay for services such as ice delivery. Many families now pay a smaller share of their incomes as installments on goods to replace those services, such as refrigerators. Finally, he says, the community has changed its attitude about installment credit—there is no stigma attached to buying on credit today.

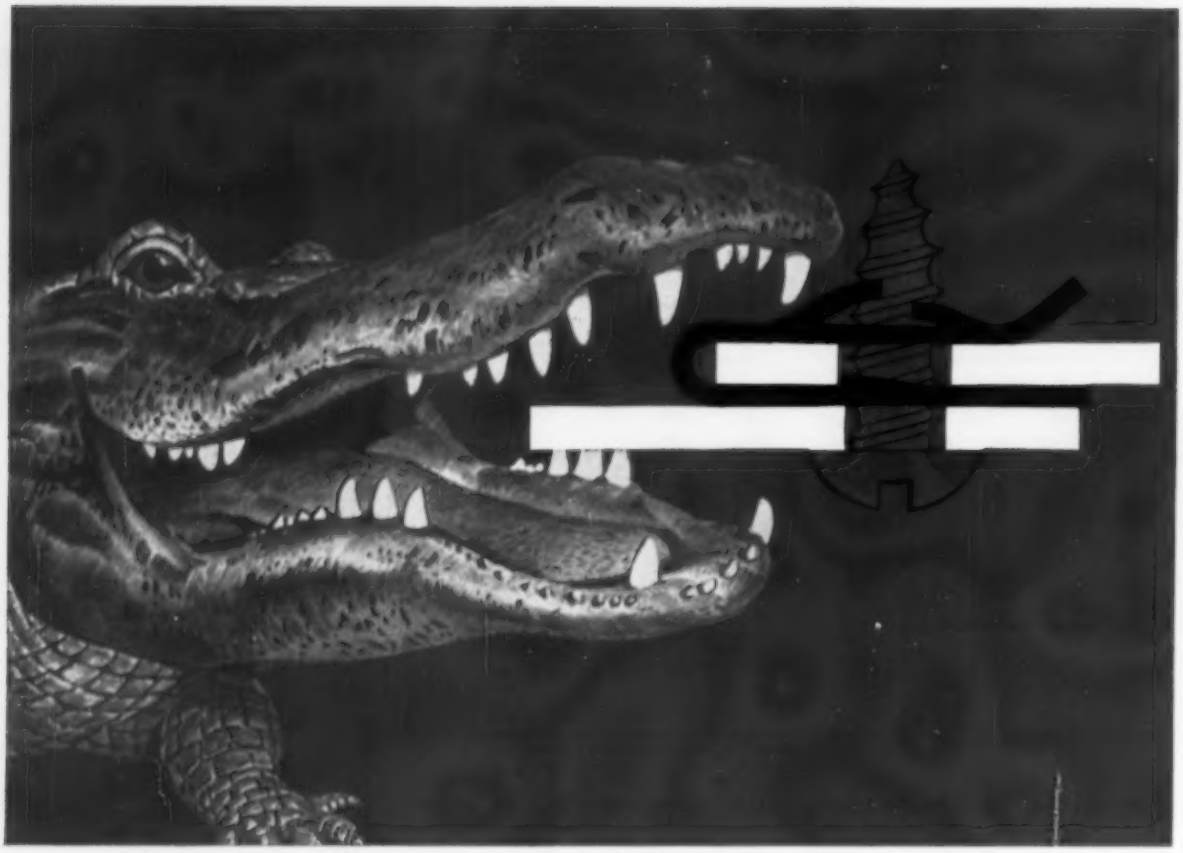
MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP
no standard is too exacting

Temper requirements for the thin nickel strip (.002") used in sensitive electronic tubes were too exacting to be checked by the usual methods. So Somers carefully hand checks several samples from each lot by the ultra-precise "bend test" illustrated above.

Since 1910 Somers Brass Company has specialized in producing thin strip: nickel and its alloys below .020" and copper and its alloys below .012" with the tensile properties, fatigue resistance, drawing properties and many other requirements which only the most exacting standards of production and quality control can meet.

Whatever your specifications may be, why not take advantage of Somers long experience? Write for field engineer or Confidential Data Blank for a complete survey of your problem at no cost or obligation.

FOR EXACTING STANDARDS ONLY
Somers
Somers Brass Company, Inc.
WATERBURY, CONN.



STEEL JAWS THAT NEVER RELAX
fasten a fastener in place

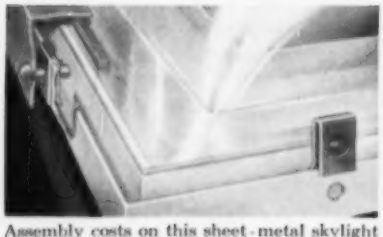
Alligator jaws have nothing on Tinnerman "U" and "J" type fasteners in gripping power. These fasteners press easily into locked-on position over panel edge or center panel locations. Yet they provide positive self-retention, ending the need for welding, staking or other secondary fastening devices. They are ideally suited for blind assembly or hard-to-reach locations.

When combined with the familiar Tinnerman SPEED NUT, this unique fastening principle provides a one-piece, self-locking, self-retaining fastener that is fast and easy to apply. The "U" or "J" feature can be combined with wire and tube retainers, latches, catches and a host of other fastening requirements to save time, material and production costs.

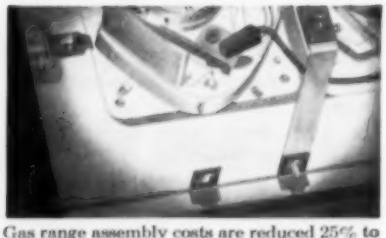
Find out about these and more than 8,000 other types of SPEED NUT brand fasteners now serving industry all around the world. They can make important savings for you, can also simplify your assemblies. See your Tinnerman representative soon or write to us. **Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.**

TINNERMAN
Speed Nuts®
FASTEST THING IN FASTENINGS®

Greater flexibility for control equipment enclosures is provided by self-retaining "J" type SPEED NUTS at 30% less production cost.



Assembly costs on this sheet-metal skylight frame are reduced 66⅔% by Tinnerman "U" type SPEED NUTS.



Gas range assembly costs are reduced 25% to 50% by using Tinnerman "U" and "J" type SPEED NUTS.

G. W. TRICHEL
. . . president of Amplex Division

G. W. Trichel was elected president of **Amplex Division**, Chrysler Corp., Detroit. He succeeds **A. J. Langhammer** who is retiring June 30 and will act as a consultant until that time. Mr. Trichel was executive vice president and general manager.

Hal Dornsife joined **Herrick Iron Works**, Oakland, Calif., as vice president and general manager. He served in a similar capacity with California Steel Products Co.

Patrick E. Dempsey was appointed chief metallurgist of **Kensington Steel Co.**, Chicago, a subsidiary of Poor & Co. His former experience includes association with Aluminum Co. of Canada, Dominion Iron & Steel Ltd. and Sorel Industries Ltd.

Bethlehem Steel Co., Bethlehem, Pa., named **John Marsh** to succeed **R. S. Dougherty**, retired, as manager of research.

Kenneth W. Thiele was elected president and treasurer of **Miami-Dickerson Steel Co.**, Dayton, O.

J. E. Mullen, vice president-manufacturing, **Nice Ball Bearing Co.**, Philadelphia, will retire July 1. He will be succeeded by **Henry M. McAdoo Jr.**, present plant manager. **John J. Larkin** will become plant manager and **Thomas E. Spence** chief engineer.

ROBERT S. INGERSOLL
. . . Borg-Warner president

Robert S. Ingersoll, an administrative vice president, was elected president of **Borg-Warner Corp.**, Chicago. He succeeds **Roy C. Ingersoll** who was re-elected chairman and named chief executive officer. **Lester G. Porter**, also an administrative vice president, was elected executive vice president and **Albert Steg** was named financial vice president and treasurer. **Robert W. Murphy**, vice president and general counsel, was named vice chairman of the executive committee.

John A. Marsh was named vice president in charge of air and hydraulic sales by **Rivett Lathe & Grinder Inc.**, Boston. He was sales manager, air and hydraulic division.

Bart A. Rossfeld was elected vice president, **National Bearing Division**, American Brake Shoe Co., at St. Louis. **Albert L. Hunt** was made general manager of the division's St. Louis plant.

Murray Simpson was elected an assistant vice president of **W. L. Maxson Corp.**, New York. He will head electronic research and development activities.

Harold E. Taylor was made superintendent, coke and chemicals department, **Alan Wood Steel Co.**, Conshohocken, Pa. He succeeds **Paul C. Mayfield**, retired.

EDWARD L. LADD
. . . president, United Aircraft Products

Edward L. Ladd was elected president of **United Aircraft Products Inc.**, Dayton, O., to succeed the late **John M. Meyers**. Mr. Ladd was executive vice president and general manager.

Joel Hunter, president, will succeed **William P. Snyder Jr.** later this month as chief executive officer of **Crucible Steel Co. of America**, Pittsburgh. Mr. Snyder will retire as active head of the company but continues as chairman.

William E. Bour fills the new post of manager of the threading tools division of **National Acme Co.**, Cleveland.

Ross H. Dean was made sales manager, **Sterling Inc.**, Milwaukee. He was sales manager, special products division, Pressed Steel Tank Co.

H. G. Ebdon, vice president-general sales manager, **Combustion Engineering Inc.**, New York, was named executive vice president.

Frank W. Godsey Jr., **A. M. Kennedy Jr.**, **F. M. Sloan** and **W. Waits Smith** were elected vice presidents of **Westinghouse Electric Corp.** Mr. Godsey is manager, electronics, x-ray and air arm divisions, at Baltimore. Mr. Kennedy is manager, purchases and traffic, at Pittsburgh. Mr. Sloan is manager, lamp division, Bloomfield, N. J. Mr.

ROBERT H. MORSE III

D. L. HARWOOD

J. F. WEIFFENBACH

. . . executive positions at Fairbanks, Morse & Co.

Smith continues direction of the aviation gas turbine division at Kansas City, Mo.

Clyde T. Mooney joined **Engineering Service Inc. of America**, Detroit, as president and general manager. **Joseph J. Grum** and **K. C. Martens**, who acquired ownership of the firm in September, 1955, become vice president and secretary - treasurer, respectively. All were formerly associated with Pioneer Engineering Co. Mr. Mooney was vice president-general manager; Mr. Grum, chief engineer; and Mr. Martens, chief die engineer.

Wayne C. Tustin was promoted to supervisor of air-break switch engineering at the Santa Clara, Calif., plant of Pacific Switchgear Division, **Federal Pacific Electric Co. Philip S. Cannon** was appointed to the executive staff of Federal Pacific at Newark, N. J. He was formerly with Henry & Wright Division, Emhart Mfg. Co.

Edgar Washburn, formerly vice president-general manager, was elected executive vice president, **American Engineering Co.**, Philadelphia. He is succeeded by **W. C. Miles**, former vice president-assistant general manager.

Jack A. Yoblin, former research metallurgist, Titanium Metals Corp. of America, joined **Carboloy Department**, General Electric Co., Detroit, as carbide products development engineer.

Fairbanks, Morse & Co., Chicago, elected **Robert H. Morse III** vice president-sales; **D. L. Harwood**, vice president-purchases; and **J. F. Weiffenbach**, director of engineering.

Richard I. Kern fills the new post of general marketing manager, **Miniature Precision Bearings Inc.**, Keene, N. H. He is succeeded by **Henry J. Egg** as western manager at the Goleta, Calif., branch office. **Kenneth G. Broman** was named sales manager of the company.

W. C. Hale Jr. was elected president of **South Chester Corp.**, Lester, Pa.; **Dodge Steel Co.**, Philadelphia; and **Lion Fastener Co.**, Honeoye Falls, N. Y., all subsidiaries of South Chester Tube Co., Chester, Pa. He succeeds **L. A. Estes** who becomes chairman of the three. Mr. Estes continues as president, Mr. Hale as executive vice president of the parent company.

Sylvania Electric Products Inc., New York, elected **Dr. Bennett S. Ellefson** vice president-engineering and research; and **Marion E. Pettegrew** vice president for tungsten-chemical and parts operations.

Robert W. Miller, a specialist in the field of induction heating, has joined the process machinery division of **Cincinnati Milling Machine Co.**, Cincinnati.

E. W. Valensi was elected president of **North American Refractories Co.**, Cleveland. He was first vice president and treasurer. **H. H. Hopwood** was made first vice president and is succeeded as vice president-sales by **J. A. Stott**, former sales manager. Mr. Valensi succeeds **Harvey E. Stuhler**, now chairman.

L. Ovid Sperry was promoted to assistant superintendent of the North Plant department of **Granite City Steel Co.**, Granite City, Ill. He is replaced as assistant to the superintendent by **David W. Boyles**, a senior industrial engineer.

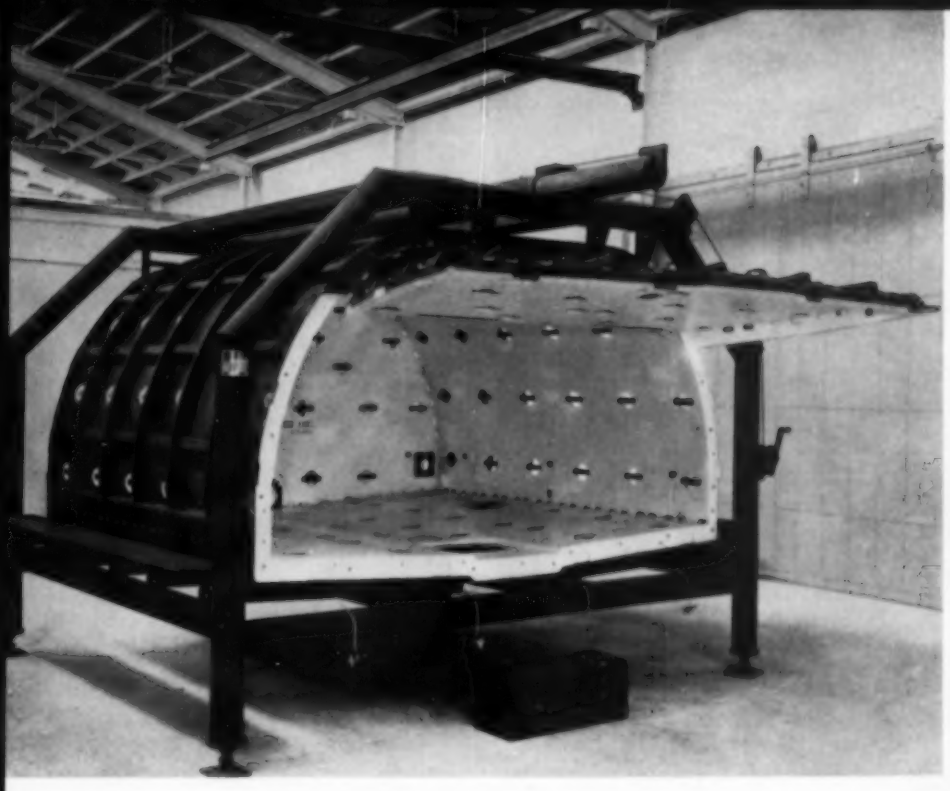
William J. Vonah was made New York district sales manager for **Erie Forge & Steel Corp.** He held a similar post with Camden Forge Co.

K. Kelly Kennan was made San Francisco district sales manager for **Robertshaw-Fulton Controls Co.'s** heating appliance controls division.

E. E. McVeigh was named manager of sales engineering by **Baker-Raulang Co.**, Cleveland. He joined Baker in 1940 and has been in field engineering and sales.

R. W. Preston was appointed vice president of the eastern branch of **National Rack Co.**, Paterson, N. J. He will also serve as assistant to the eastern plant manager.

H. George De Young was elected president of **Atlas Steels Ltd.**, Welland, Ont. **Roy H. Davis**, founder of Atlas Steels, became first chair-



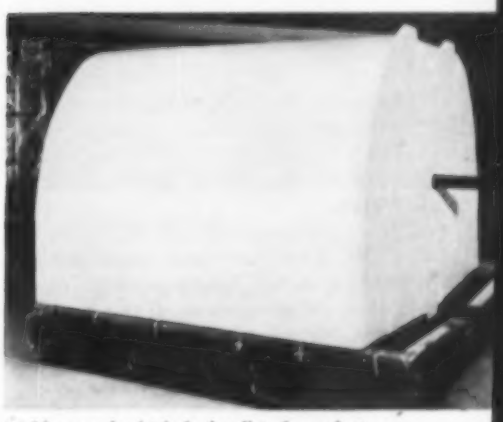
Plastic checking fixture is a lamination of glass cloth layers with compounds based on BAKELITE Epoxy Resins. It was built by W. B. Whittington Co., Los Angeles, Calif., using "Epocast" compounds formulated by **Furane Plastics, Inc.,** Los Angeles 39, Calif.

Huge epoxy-built checking fixture

Holds tolerances to ± .004 in.!

Fitting a fuel cell in the B-52A is a tight squeeze. They're checked for size in this big—and highly accurate—plastic checking fixture. Its 249 check points match those on the plane with tolerance of ± .004 in.!

Such precision in a fixture so large reflects the dimensional stability in plastic tools made with glass cloth and compounds based on BAKELITE Brand Epoxy Resins. These compounds are handled as liquids, are readily formed and cure at room temperature, to an extreme hardness that permits precision machining. Finished tools are tough, lighter-in-weight, durable. As a result, manufacturers faced with fast model changes use these plastic materials to speed both tooling and production.



Mold around which fuel cell is formed gives indication of tank's size. Checking fixture is even larger, since it measures outside dimensions.

For metalworking...

BAKELITE BRAND EPOXY RESINS

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

SAMUEL A. OTT
. . . CF&I Claymont, Del., works mgr.

LEONARD C. BARR
. . . Gregory Industries v. p.-operations

CLARENCE G. ROSENSWEIG
. . . Fafnir Bearing president

man of the board. Mr. De Young was executive vice president.

Samuel A. Ott was made works manager of the Claymont, Del., plant of **Colorado Fuel & Iron Corp.** He was superintendent of Midvale Co. and had served as chief metallurgist and assistant to the vice president of Penn-Ohio Steel Corp.

Harry J. Draine was made superintendent of **Youngstown Sheet & Tube Co.'s** blast furnace department at the South Chicago, Ill., Works.

L. W. Tomlinson was made purchasing agent, television-radio division, **Westinghouse Electric Corp.**, Metuchen, N. J.

Alexander MacGillivray was elected vice president-finance of **Hughes Aircraft Co.**, Los Angeles.

Kenneth A. Perko was elected treasurer of **Ferry Cap & Set Screw Co.**, Cleveland.

Gregory Industries Inc., Toledo, O., elected **Leonard C. Barr** vice president and director of operations; **Maurice A. Enright,** vice president and director of planning; **Robert C. Singleton,** vice president-engineering; and **Gene P. Hopkins,** vice president-manufacturing. **Robert J. Kilmer** was made financial vice president and treasurer; **George E. Gregory Jr.,** controller; and **Thomas A. Piraino,** secretary and manager of administrative services. **Horace S. Maynard,** former secretary-treasurer, was elected vice president.

Anthony J. Pelson was made assistant sales manager in charge of distributor sales for **Continental Screw Co.**, New Bedford, Mass.

Francis D. Holden was elected vice president-sales for **Macwhyte Co.**, Kenosha, Wis. He was sales manager.

David E. Patty and **James D. Barlow** were appointed buyers for **Leece-Neville Co.**, Cleveland.

Clarence G. Rosensweig was elected president of **Fafnir Bearing Co.**, New Britain, Conn. Formerly executive vice president, he succeeds **Stanley M. Cooper,** now chairman. **Richard F. Cooper** was named vice president - manufacturing. The former chairman, **Maurice Stanley,** has retired after 42 years with the company.

New vice presidents of **Aluminum Co. of America,** Pittsburgh, are: **H. E. Bakken,** general manager, refining division; **J. P. Haight,** chief engineer; **Lawrence Litchfield Jr.,** general manager, mining division; **R. T. Whitzel,** general production manager; and **Edward B. Wilber,** treasurer.

Roy J. McKay was named production manager and assistant chief engineer, **Omega Die Casting Co. Inc.**, San Diego, Calif.

Dick W. Pehl was named superintendent, mechanical maintenance, at **Kaiser Steel Corp.'s** Fontana, Calif., Works.

OBITUARIES . . .

Emil H. Ramser, 68, general superintendent, **Transue & Williams Steel Forging Corp.**, Alliance, O., died Apr. 27.

M. L. Watson, 58, general manager of steel processing for **Donovan Wire & Iron Co.**, Toledo, O., died Apr. 27.

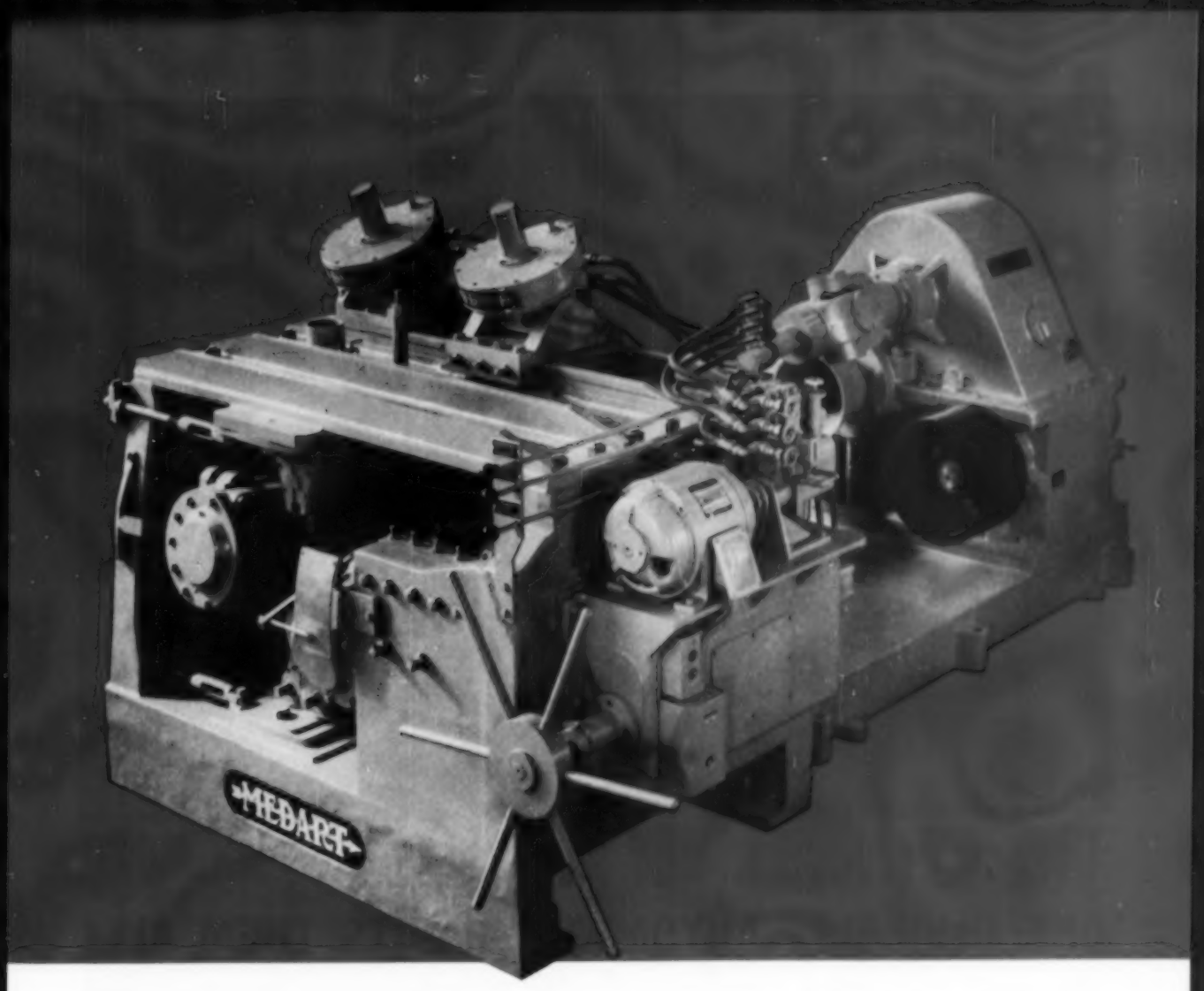
Rolland H. Mogle, 50, assistant production engineer, **Electric Auto-Lite Co.**, Toledo, O., died Apr. 23.

William A. Thompson, 79, retired vice president and secretary, **Allis-Chalmers Mfg. Co.**, Milwaukee, died Apr. 25.

Louis J. Ehlinger, 75, who retired in August as assistant chief engineer of **Alan Wood Steel Co.**, Conshohocken, Pa., died Apr. 27.

Raymond M. Jastram, 48, production manager, **John Gombos Co. Inc.**, Irvington, N. J., died May 1.

Fredrick H. Bassett, 55, district sales manager, **American Steel Foundries,** died Apr. 29 in Denver.



BLAW-KNOX MEDART makes what it takes

for continuous, high speed straightening, sizing and polishing

You can meet the most rigid requirements for cold finishing round bars, pipes and tubes with a Blaw-Knox Medart 2-roll Rotary Straightener. Designed to perform with the greatest accuracy, it straightens, "super-finishes," and corrects out-of-roundness in one operation.

Processing begins the instant the workpiece enters the rolls and continues right up to the very end. Because of this you can straighten short lengths as well as longer standard mill lengths. A modified straight roll then deflects the workpiece into the concave roll giving it a tremendous number of straightening cycles per foot, assuring precision straightening and sizing.

And this highly accurate finishing can be delivered at throughput speeds up to 350 ft/min. Operation is continuous by means of end-to-end feeding. The drive motor can be reversed with the bar between rolls to permit additional passes for sizing and polishing.

The speed, versatility, and accuracy of Blaw-Knox Medart 2-roll Rotary's have made them the standard of the industry. Available in ten sizes, they can handle workpieces from ¼" to 9" diameter. Contact us for detailed information, technical assistance or service.

50th Anniversary
BLAW-KNOX
1906 1956

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

CONTINENTAL

NO PART THE SAME SIZE OR SHAPE, YET . . .

ONE DeVILBISS AUTOMATIC PAINTS THEM ALL!

At NuTone, Inc., Cincinnati, Ohio, large-scale production of the new NuTone Mixer-Blender – in glistening two-tone baked enamel – demonstrates the flexibility and efficiency of DeVilbiss automatic finishing equipment.

Averaging 1,000 parts of varying sizes and shapes per hour, one DeVilbiss automatic machine spray-applies one-coat finishes with flow-out and coverage rivaling most two- and three-coat jobs!

An ingenious automatic control device actuates only those guns, from a battery of four, needed to provide complete coverage as different parts pass the spray station. Spit-second timing of the guns, and synchronized rotation of the parts ensure uniform film build on all surfaces – despite undercuts, deep recesses, and complex contours.

Over-all results: high production at remarkably low cost, consistently high-quality finishes, negligible number of rejects.

For full information about DeVilbiss automatic spray equipment, call your nearby representative. He'll provide you with many time- and cost-saving suggestions for your finishing operations.

All painting of NuTone Mixer-Blender components is performed at this spray station. The automatic guns are served by a DeVilbiss paint heater, located on the side of the spray booth.

THE DeVILBISS COMPANY
Toledo 1, Ohio
Santa Clara, Calif. • Barrie, Ontario
London, England
Branch Offices in Principal Cities

FOR BETTER SERVICE, BUY
DeVILBISS

Carrier To Build

$6-million plant on West Coast will turn out air conditioning units, furnaces, water heaters

PRODUCTION of air conditioning equipment, furnaces and water heaters will be stepped up on the West Coast. Carrier Corp., Syracuse, N. Y., will build a $6-million plant for this purpose at Puente, Calif., 18 miles east of Los Angeles.

The plant will have an area of more than 500,000 sq ft, providing expanded facilities for the rapidly growing production needs of Carrier's Day & Night and Payne divisions. In addition, it will produce equipment for other divisions.

William J. Bailey, Carrier vice president and general manager of the divisions now at Monrovia, Calif., will be in over-all charge of the new plant. He said that operations of the Monrovia Aviation Division will continue at the Monrovia site and the Spectrol Electronic Division will remain at nearby San Gabriel.

Will Install Oxygen Converters

Pennsylvania Engineering Corp., New Castle, Pa., will fabricate two top-blown oxygen steel converters of 65-ton capacity. They are for the Aliquippa Works of Jones & Laughlin Steel Corp.—the second installation of the process for steelmaking in the U. S. The first (two 35-ton vessels) went in at McLouth Steel Corp.

Foundry Will Expand

De Laval Steam Turbine Co., Trenton, N. J., will expand its Meehanite foundry facilities. The project includes a 6000-sq-ft building addition, modernization of facilities for sand conveying, casting-cleaning and radiographic inspection.

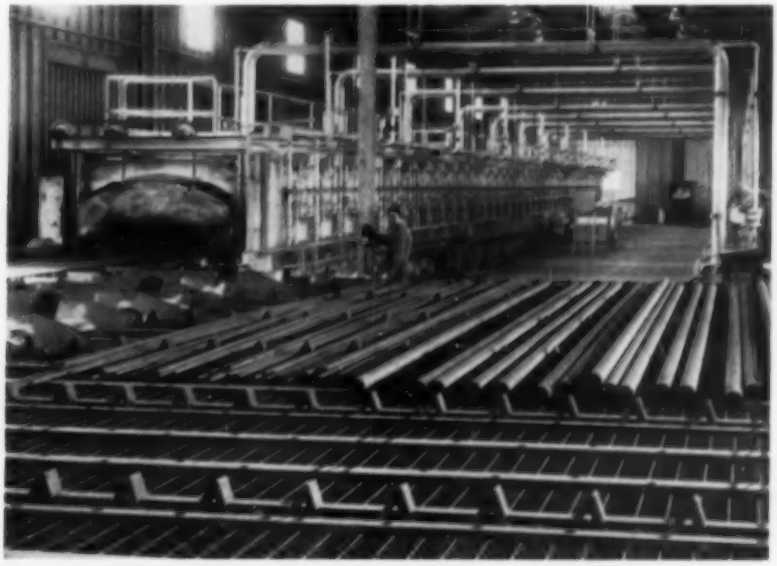
Snyder Tool Completes Project

Snyder Tool & Engineering Co. has completed a $600,000 expansion of its plant at 3400 E. Lafayette, Detroit. The firm makes automated special machine tools. Floor space was increased 50 per cent.

Barry Buys Sheet Metal Firm

Barry Controls Inc., Watertown, Mass., purchased all physical assets of United States Sheet Metal Products Co., Burbank, Calif. The acquisition was made to establish a western division for design and

(*Please turn to page* 98)



New Furnace Goes Into Operation at Timken's Mill

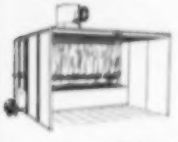
This is the discharge end of a roller hearth furnace erected by Timken Roller Bearing Co. at its Gambrinus steel mill. It measures 150 ft 6 in. long, 6 ft wide, 3 ft high. Its capacity is 4000 tons of steel a month. The furnace will increase annealing capacity to meet expanded demand for seamless tubing

DEVILBISS ANSWERS ALL COATING NEEDS

DeVilbiss has the industry's most complete line of spray equipment and accessories . . . for fast, efficient, low-cost application of anything that pours — paints, drawing compounds, adhesives, catalyst materials and similar liquids. Write for data.

DeVilbiss spray guns are precision built for finest performance. High-speed, manual or automatic service.

DeVilbiss air compressors deliver up to 22.6% more air per power dollar than most others. Stationary and portable models. ½ through 15 hp.



DeVilbiss spray booths come in a complete range of standardized types, sizes—fireproof, reinforced steel panel construction.

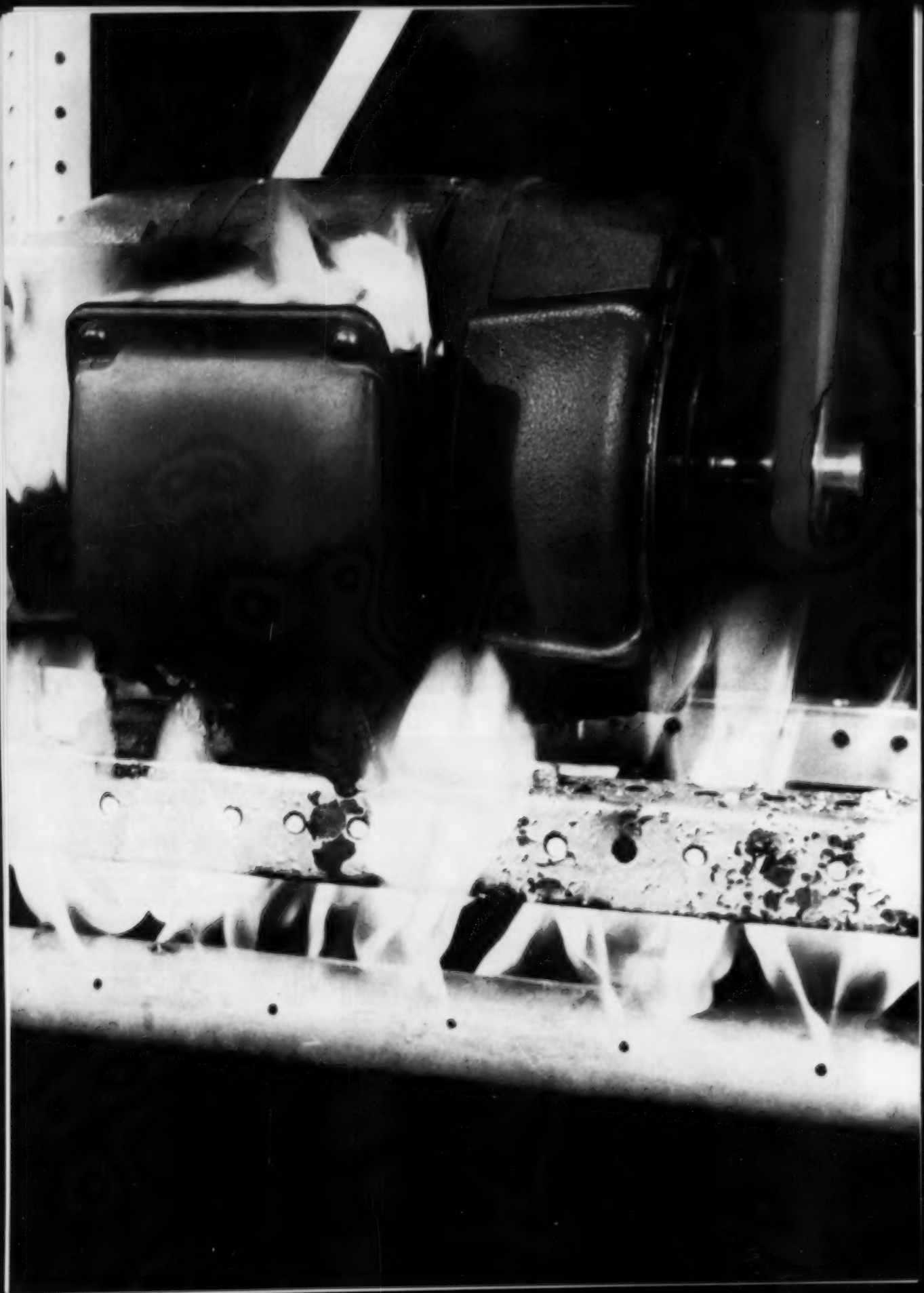
DeVilbiss hose is specially fabricated for longer service; is solvent resistant.

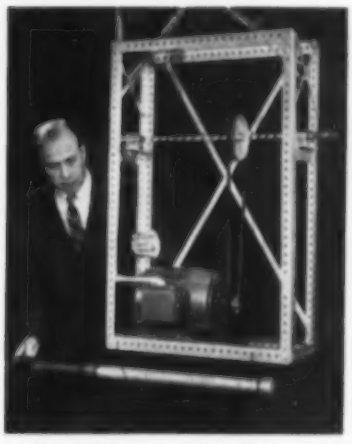
THE DEVILBISS COMPANY
Toledo 1, Ohio

Santa Clara, Calif.
Barrie, Ontario
London, England

DEVILBISS

Branch Offices in Principal Cities





TOMORROW:

A standard motor that can survive infinite heat

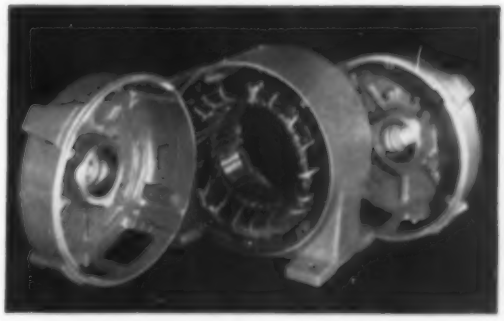
The new Life-Line A is another step closer

Westinghouse is working on tomorrow's motor today. Investigating new materials—testing existing motor designs.

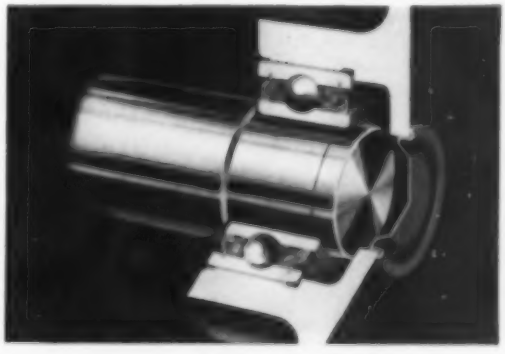
No standard motor today can survive the ultimate test shown here. But we do know that the new Life-Line® "A" can operate under higher temperatures than ever before. It has stronger insulation and better bearing protection than any other motor on the market. It's industry's closest approach to a standard motor that is absolutely heatproof.

Your Westinghouse sales engineer can show you many additional reasons why the Life-Line "A" is industry's most advanced and preferred motor. Call him today.

J-21926



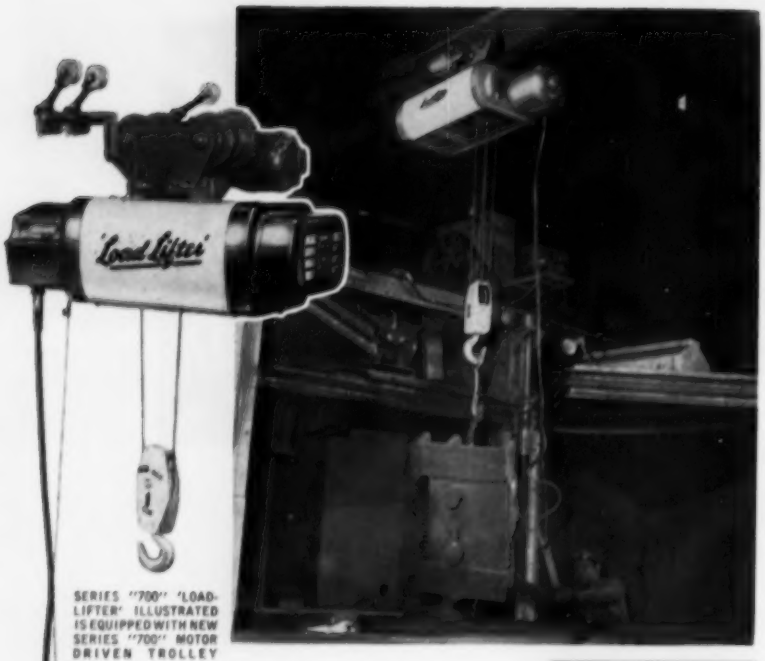
New fortified insulation includes exclusive Bondar, Bondlite and Mylar*—three good reasons why the Life-Line "A" is so resistant to heat or any other motor contamination.
*DuPont Registered Trade-Mark



Two outer seals of new 4-way sealed bearing act as flingers and literally throw off damaging contaminations. Inner seals, attached to outer bearing race, are stationary and form a positive labyrinth.

WATCH WESTINGHOUSE!

WHERE BIG THINGS ARE HAPPENING TODAY!



SERIES "700" 'LOAD-LIFTER' ILLUSTRATED IS EQUIPPED WITH NEW SERIES "700" MOTOR DRIVEN TROLLEY

HUSKY 'LOAD LIFTER'

LIFTS 1 TON
1 FOOT
IN 1 SECOND

Production economy demands top-quality hoists that are fast, rugged, safe and easy to maintain. You get all four essentials in the Series "700" 'Load Lifter' Electric Hoist.

The Series "700" 'Load Lifter' speeds load handling on every job. With only 24 volts at the push buttons, the operator is safe. It has a load brake and a motor brake. The full load can be held safely by either brake *alone*. Braking action is fast and safe. The load can't drop back. Accurate spotting is never a problem.

The Series "700" 'Load Lifter' Electric Hoist is built extra tough to stand up in the toughest services. Every moving part is engineered and manufactured to function smoothly and without needless wear. Safety construction and safety devices provide complete protection against operational hazards. The hoist can be inspected and serviced *in the air*, without removing the load. Capacities range up to 15 tons. Single and two-speed models available with your choice of suspension. *Get details from your "Shaw-Box" Distributor or write us for Bulletin 410.*

'Load Lifter'® ELECTRIC HOISTS

MAXWELL MANNING & MOORE INC. TRADE MARK

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

(*Concluded from page 95*)

production of Barry's shock and vibration mountings for aircraft and missiles.

Republic Foil Enlarges Plant

Republic Foil & Metal Mills Inc., Danbury, Conn., is constructing an 8500-sq-ft extension to its plant. It will house offices and provide manufacturing space needed for new equipment which is scheduled to be installed during the second half of the year.

Metal & Thermit Buys Glenn Co.

Metal & Thermit Corp., New York, acquired Glenn Co., Oakland, Calif., maker of constant voltage power sources, welding wire feeding devices and other products. The business is being moved to 703 37th Ave., Oakland, where it will be operated as a subsidiary under the name of M&T Welding Products Corp.

Bristol Brass Opens Branch

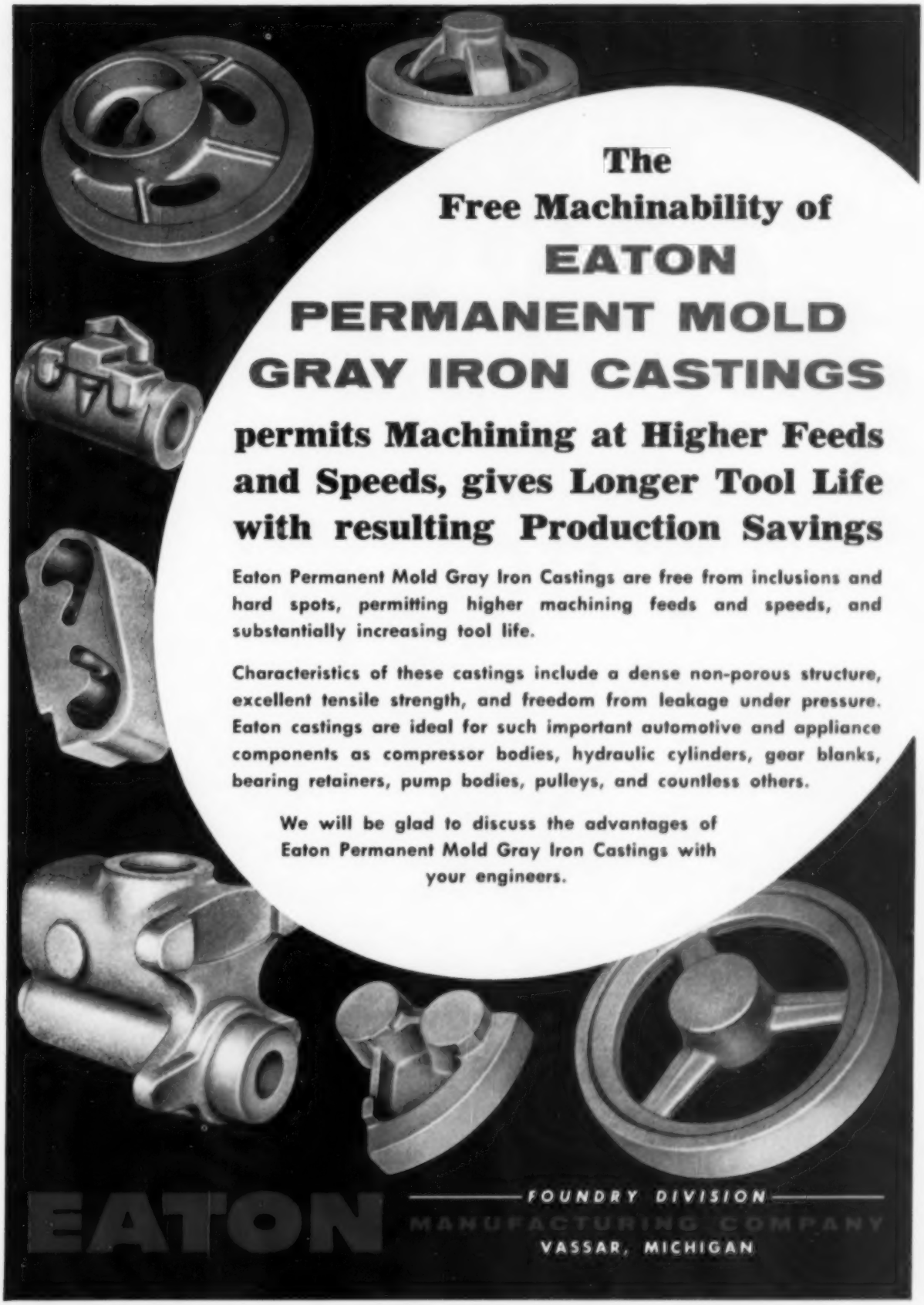
Bristol Brass Corp., Bristol, Conn., has established an office and warehouse at 1448 E. 49th St., Cleveland, under the direction of C. G. Sanford, district manager. The warehouse carries stocks of brass rod, sheet, strip and wire.

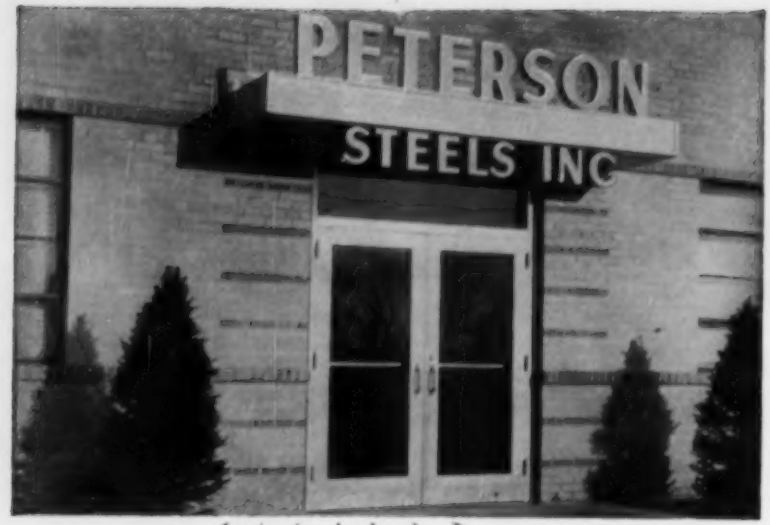
Bryant Electric To Build

Bryant Electric Co., Bridgeport, Conn., will put in completely integated plant facilities near Danielson, Conn. Products to be made: Electrical wiring and switching devices and appliance controls. Bryant Electric, a wholly owned subsidiary of Westinghouse Electric Corp., plans to increase its wiring device sales more than 50 per cent during the next five years.

Buys Matteson Equipment Co.

E. W. Bliss Co., Canton, O., purchased controlling interest in Matteson Equipment Co. Inc., Poland, O., and will operate it as a subsidiary. Matteson has been active in the design of special continuous strip annealing lines, continuous pickling processing lines, hot-dip equipment and other auxiliary equipment for steel mills. Officers


The
Free Machinability of
EATON
PERMANENT MOLD
GRAY IRON CASTINGS
permits Machining at Higher Feeds and Speeds, gives Longer Tool Life with resulting Production Savings
Eaton Permanent Mold Gray Iron Castings are free from inclusions and hard spots, permitting higher machining feeds and speeds, and substantially increasing tool life.
Characteristics of these castings include a dense non-porous structure, excellent tensile strength, and freedom from leakage under pressure. Eaton castings are ideal for such important automotive and appliance components as compressor bodies, hydraulic cylinders, gear blanks, bearing retainers, pump bodies, pulleys, and countless others.
We will be glad to discuss the advantages of Eaton Permanent Mold Gray Iron Castings with your engineers.
EATON
FOUNDRY DIVISION
MANUFACTURING COMPANY
VASSAR, MICHIGAN



DOORWAY to
YOUR STOCKPILE OF

52100
STEEL TUBING and BARS

FORGINGS

WIRE

TUBES

BARS

Write for the latest stock list.
Contains complete information on sizes, finishes, analyses, etc.

Loaded and Non-Loaded
55-1

PETERSON STEELS, INC.
UNION, NEW JERSEY
Detroit, Michigan • Chicago, Illinois

of the reorganized Matteson firm are: President, E. A. Matteson; vice president, G. W. Baillie Jr.; and secretary-treasurer, W. H. Garrison.

Opens Warehouse in Dallas

A new warehouse, Perry-Jenner Steel Co., Inc., has been established at 831 Hanszen St., Dallas, Tex. It is being stocked with Allegheny Ludlum tool steels and a complete list of other tool steels and bits. The company will build an expanded warehouse on Singleton boulevard, that city. Gayle Perry is president; Tom Jenner, secretary-treasurer.

ASSOCIATIONS

Richard C. Meloy will join the executive staff of the **Gray Iron Founders' Society Inc.**, Cleveland, as marketing director on June 1.

National Metal Trades Association, Chicago, elected Warren W. Walker president of its New York-New Jersey branch. Mr. Walker is president of Graphite Metallizing Corp., Yonkers, N. Y. Other officers of the branch are: Vice president, Gustave Young, Singer Mfg. Co., Elizabethport, N. J.; treasurer, W. E. Grigham, Rutherford Machinery Division, Sun Chemical Corp., Rutherford, N. J.

REPRESENTATIVES

Jessop Steel Co., Washington, Pa., appointed Ray J. Dearmin Co., Maywood, Calif., as tool steel distributor in Southern California. He will warehouse Jessop's tool steel bars and billets.

Wisconsin Bridge & Iron Co., Milwaukee, was appointed a distributor of **Reynolds Metals Co.'s** architectural aluminum products. M. L. Foss Inc., Denver, was named a distributor of Reynolds' aluminum mill products.

Timken Roller Bearing Co., Canton, O., appointed Alloy Steels Inc., Detroit, as a distributor of its tool steels, bars, billets and hollow shapes. A. Milne Co. and Penin-

Photograph shows CARBOFRAX® brick, raised to white heat (2460°F) in kiln, being plunged halfway into cold water —without spalling or cracking.

third in a series . . .
THERMAL SHOCK RESISTANCE

Unusual Properties of Refractory Materials

Thermal Shock Resistance in a refractory enables it to withstand rapid recurring temperature changes without spalling and cracking. Several properties affecting the degree of resistance include: thermal conductivity, ultimate strength, thermal expansion and modulus of elasticity.

A number of refractories developed by Carborundum are noted for having these properties in the ranges that insure high heat shock resistance. They successfully meet the stresses and strains imposed by intermittent firing and by high heat releases in restricted areas. In packaged steam generator service, for example, they are far superior to other lining materials. Similarly, they have produced outstanding results in rapidly-heated quickly-cooled crucible type melting furnaces, in heat treating furnaces, incinerators, still settings, etc.

The current issue of Carborundum's magazine "Refractories" features a comprehensive article on heat shock. It may offer suggestions helpful to you in handling a condition of this nature. Send for your copy today.

CARBORUNDUM
Registered Trade Mark

VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES
CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE
HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

—MAIL THIS COUPON TODAY—

Dept. W56, Refractories Division
The Carborundum Company, Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

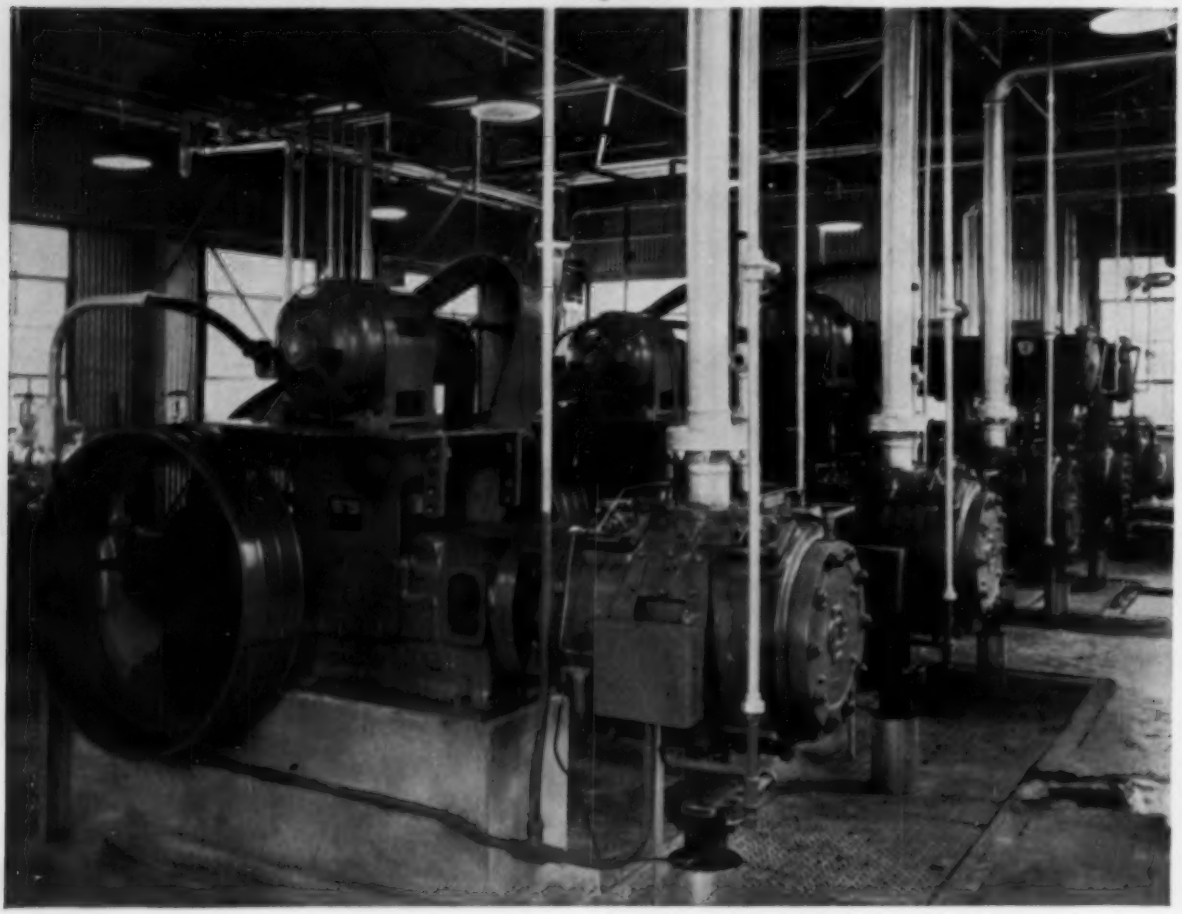
Name _____ **Title** _____

Company _____

Street _____

City _____ **Zone** _____ **State** _____

Gardner-Denver . . . Serving the World's Basic Industries



A roomful of compressors supplying instrument air . . . plant air . . . starting air . . .

it's 100% Gardner-Denver in this compressor room

Instrument air . . . furnished pure, clean and oil-free by two Gardner-Denver 10 x 9 CRX Carbon Piston Compressors.

Plant air for general use . . . supplied by a single Gardner-Denver 10 x 11 RX Single-Stage Compressor.

High-pressure air for starting diesel engines . . . supplied by two Gardner-Denver 9 & 4½ x 9 RXT Tandem Cylinder Compressors.

For any volume . . . any pressure . . . any use . . . your Gardner-Denver Compressor Specialist can fill your needs from Gardner-Denver's wide range of compressor types and sizes. Write for bulletins.

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

sular Steel Co. will handle Timken tool steels in Detroit.

Northeastern Associates Inc., Oswego, N. Y., was appointed as a representative by **Roll Formed Products Co.**, Youngstown, maker of continuously rolled metal shapes and by **Hynes Steel Products Co.**, Youngstown. Hynes will supply hot and cold-rolled sheet and strip steel.

Rivett Inc., Boston, appointed Cox Engineering & Sales Co., Detroit, as representative in that territory for its line of air and hydraulic valves, cylinders and power units.

Dow Chemical Co., Midland, Mich., appointed Ets-Hokin & Galvan, San Francisco, as distributors of its magnesium anodes. This distributor will concentrate on the cathodic protection of ship hulls in the Pacific trade.

Ampco Metal Inc., Milwaukee, appointed several stocking distributors of its raw materials, including cast bars and extruded solid rounds: Reliable Castings Corp., Cincinnati; Copper & Brass Sales Inc., Detroit; and R. G. Eide Inc., Minneapolis.

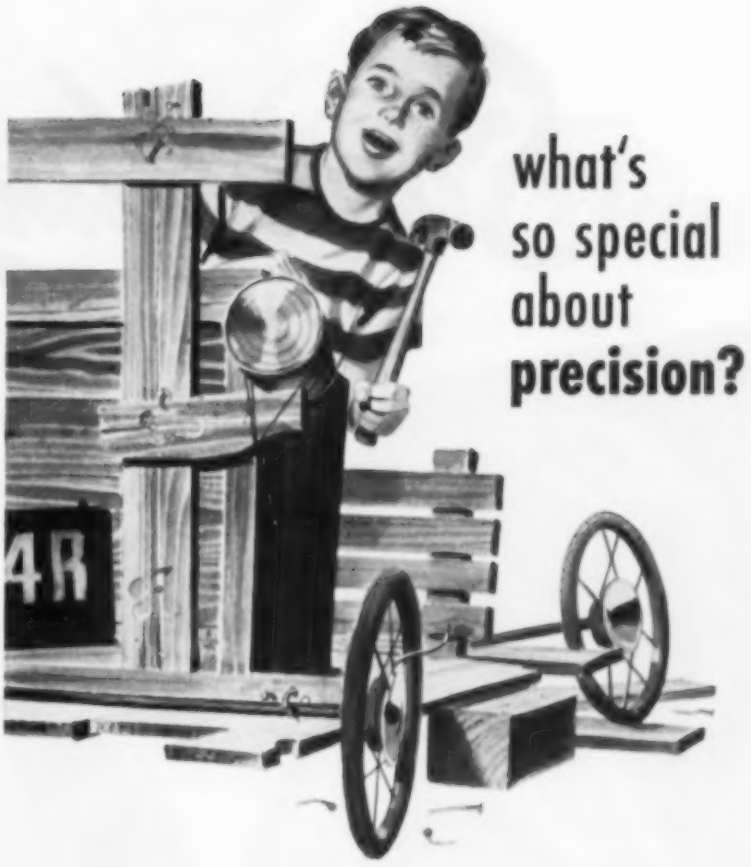
ANNIVERSARIES

Beals, McCarthy & Rogers Inc. is observing the 130th anniversary of its founding this month. A three-day open house was held by the steel and industrial supplies firm which started business as a frontier hardware store a year after the Erie Canal opened up trade to the village of Buffalo.

NEW ADDRESSES

Bethlehem Steel Co. moved its district sales office to the Prudential Bldg., Prudential Plaza, Chicago.

Jones Tool & Die Co. Inc. moved into its new and enlarged plant at 9301 N. E. 6th Ave., Miami, Fla. The company does a wide range of metalwork and tooling.



what's so special about precision?

To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6052-CH

Write today for Bulletin 1264-CH

CHANDLER PRODUCTS CORPORATION

1488 CHARDON ROAD • CLEVELAND 17, OHIO

Something more

than pushbuttons...

starts the machine-built accuracies in a *Hendey* Tool and Gage-Makers' Lathe

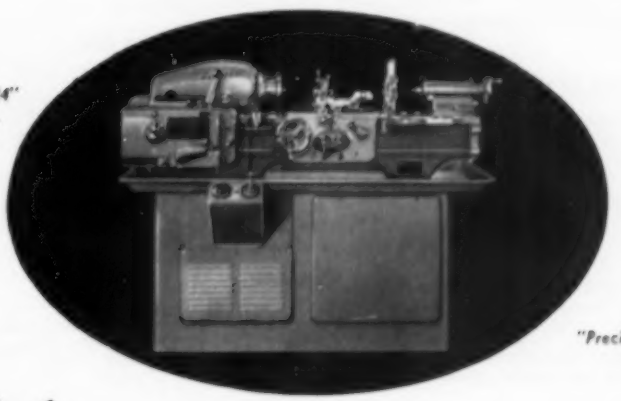
Precision *begins* with precision!

At the left a Hendey worker checks headstock spindle bore alignment of a 9 in. Tool and Gage-Makers' Lathe. *But,* before he pushes the "Start" button of his machine, he uses most exacting precision to lay out holes to be bored in the headstock. He begins by carefully locating the spindle bore, using "Jo" blocks (capable of measuring in millionths) to assure maximum accuracy. After finding this starting point, he locates other holes in precise relationship to it. Precision machining and finishing are the inevitable result of meticulous preparation and layout.

The 9 in. Tool and Gage-Makers' Lathe can be purchased with *electronically controlled* drive to provide quiet, infinitely variable spindle speeds from 15 to 3000 rpm. On facing cuts, stepped diameters, and tapers, operator can change speeds during the cut by selecting correct rpm on the control rheostat. Belt drive gives smooth, vibration-free power to the spindle for extra-fine finishes in the range from 25 to 3000 rpm. Speed range from 15 to 250 rpm is through back gears with very low velocity.

Remember, in your toolroom too — precision *begins* with precision! You can assure accuracy and reduce turning costs by installing a Hendey Tool and Gage-Makers' Lathe. Call your Hendey dealer now for complete information.

Hendey 9" x 24" Tool and Gage-Makers' Lathe



"Precision with Production"

Hendey machine division
BARBER-COLMAN COMPANY
59 LOOMIS ST., ROCKFORD, ILLINOIS

BARBER COLMAN

THIS WILL CURL YOUR EYELASHES

A Nilson #2 Four-Slide Automatic Wire Forming Machine is being used by Rollash Corporation, Brooklyn, N. Y., to form wire as shown for their eyelash curler . . . complete in one operation. After one year's operation they report savings of—

40% on actual manufacturing costs
15% on improved tooling which eliminates secondary operations.
10% on fewer rejects, full parts control assuring top precision.
. . . elimination of freight charges by making parts on premises, advantage of immediate access to production.

TOTAL SAVINGS . . . OVER 65%

NILSON 4-SLIDES FEATURE

- One-man operation
- Forming of wire or ribbon metal from coil
- One fast, automatic operation straightens, feeds, pierces, blanks, stamps or coins, cuts off, forms
- Critical tolerances up to .002" on any runs
- Fast tool and die changing
- Wide size range—forms wire up to ½" dia. in feeds to 32" max. Ribbon stock up to 3½" wide
- Press sections 5 to 30 ton cap.
- Heavy duty models 50—75 ton cap.

Without obligation, Nilson provides specific forming recommendations from detailed information. Send for A. H. Nilson catalogs . . . the first step in increased production.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

4

STEEL's 1956 Management Series . . .

The editors of STEEL herewith present the fourth in their ten-part series, Program for Management for 1956. The complete list:

1. **It's Time To Grow** (Feb. 13, p. 81)
2. **Know Your Costs** (Mar. 19, p. 83)
3. **Ideas for Industry** (Apr. 23, p. 105)
4. **Metalworking Goes to Market** (May 14, p. 107)
5. **Metalworking's New Horizons** (June 18)
6. **How To Live with SUB** (July 16)
7. **To Merge or Not To Merge** (Aug. 13)
8. **Motivating Men To Produce** (Sept. 24)
9. **Automation—Bogeyman or Bonanza** (Oct. 15)
10. **Industry and College—Partners in Development** (Nov. 12)

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Better communication needed as . . .

Metalworking Goes to Market

"NOBODY ever beat any path to any door for any mousetrap—no matter how good it was."

So says Clay H. Hollister, chairman of Case Institute of Technology's Department of Engineering Administration. He thinks too many businessmen are misled by the mousetrap doctrine. They discount, or overlook, the role of communication in distribution.

Experts agree that a distribution system isn't on the right track unless: 1. You know what buyers want. 2. You tell them you have it for them.

Even if you build a better mousetrap, how do you know people really want it? Maybe they don't have mice. Maybe they prefer another method of extermination.

Granted that there is a market for your product, how will potential customers know you make mousetraps unless you tell them?

New Look—"Many problems in distribution could be solved," believes Professor Hollister, "if people analyzed the communication aspects of the subject adequately." He suggests that distribution be considered as having two sides.

The first can be called the material handling phase. That's the physical method of moving to market — the kind of transportation you use, the way you package your product, the way or ways you sell it.

Of course, the battle hasn't been won here. Businessmen still ponder such puzzles as: Should we

DISTRIBUTION'S
COMMUNICATION
NETWORK

1. Learn What the User Wants

Using various methods to determine buying motivation, Philco Corp. checked preferences on stoves and refrigerators. Here's a sample of some of the things it found:

1. In the South, buyers prefer an electric range with burners divided on either side of the top area.

2. In the North, buyers prefer an electric range with burners clustered on one side of the top area.

3. Potential customers for a freezer-refrigerator prefer the freezing unit on the bottom.

Superficial discoveries? Maybe, but those styling features, unearthed as a result of good communications, are helping to sell more Philco products.

More knowledge about what buyers want in industrial products is needed, too. The American Steel Warehouse Association and the Committee of Stainless Steel Producers of the American Iron & Steel Institute are co-operating in the first concerted attempt to discover how stainless steel is used.

For the first six months this year, warehouses are reporting detailed statistics about where they sell their stainless and what it will be used for. When the survey is completed, the confidential data from all co-operating warehouses will be combined, translated into total warehouse distribution and published by ASWA. Each participator will receive confidential tabulations of his own end-use shipments.

Total figures will also go to AISI. Steel producers, both collectively and individually, will be able to back up sales efforts with better market information and more effective advertising and promotion.

use truck or rail? Should we package in units of 16 or 8 or 4? Should we sell through distributors or direct salesmen? While difficult, these problems have been apparent for years, and much work has already been done on them.

But the second side, the communication aspect of distribution, has had less exploration. Certain parts of it, such as selling and advertising, have had extensive attention, but as separate problems they have not been integrated with the whole communication problem.

Definition — Distribution (also called marketing) includes all activities of retailing, wholesaling, servicing and transportation required to move goods from the point of manufacture to the point of sale. This movement should include the flow of ideas and information, as well as the flow of goods.

In the flow of ideas, there are two problems. First, the manufacturer must know what the customer wants—design, quantity, use, performance, delivery and time requirements. (Development of techniques to get this information is in its infancy.) Second, the maker must let the potential user know quickly and effectively that he has the product available in the correct design and quantity, for the proper use and performance, for fast delivery from a convenient point. Needed here is a two-way exchange of information. If there is such communication, says Professor Hollister, the time-honored idea is that it should come through the various channels of physical distribution.

Fallacy—But the physical distribution system is designed to go just one way—from maker to user. You may get ideas about market trends and conditions from your salesmen, of course. But how complete are they? How accurate?

In the late 1940s Chrysler Corp. reportedly based its styling decisions on reports from dealers and others that the public wanted shorter, smaller cars to cope with congested traffic conditions. Chrysler's styling of the late 1940s and early 1950s almost ruined the company. It turned out the public didn't want stubby styling. Chrysler revised its methods of getting information about the public's desires, and since then, it has made a strong comeback. Incidentally, the corporation has also taken steps to improve the maker-to-user flow of information — primarily with increased advertising.

The How of It—How can you improve distribution's communication network? Professor Hollister

suggests taking advantage of occasions when maker and user normally have contact with each other. There are seven.

1. What the User Wants

In normal sequence, the first contact involves finding out what the user wants. Use one or a combination of these five approaches to your customer:

1. Through your own personnel. Employee suggestion systems may turn up unexpected material on requirements of customers. Your salesmen are obviously in the prime spot to keep you informed. But check their reports. They have to be optimists. They may view prospects through rose-colored glasses. Some companies give their salesmen brief training in how to do field market research. Many companies also employ large marketing research staffs to make field checks, or hire an outside research organization to do a spot job.

One company president makes a point of calling on 50 of his most important customers every year. Each visit takes a day. The president takes a carefully prepared list of questions with him. All are aimed at finding out what the customer wants.

2. Through your competitors. Check their products, advertising and catalogs.

3. Through trade associations and shows. Industrial and trade shows usually have a "what's new and wanted" theme. Attend those in your own industry and in your customers' fields.

4. Through government publications. Check the catalogs, booklets and indexes of the Commerce, Agriculture and Defense departments, the Small Business Administration, the U. S. Patent Office and research and development groups.

Patent office files contain millions of inventions and designs covering every phase and facet of industry. Whether old, new, expired or dedicated, these patents are a source of new product and improvement ideas.

5. Through business publications. Some 2300 in the nation live on communicating ideas for prod-

DISTRIBUTION'S COMMUNICATION NETWORK

2. Tell What the Product Is

Product information is often good to start with, but it loses its punch by the time it filters down to the customer through company salesmen, distributors and their salesmen. Realizing that, Republic Steel Corp. is launching an Order Makers' Institute (OMI), which is designed for the corporation's 400 distributors of pipe.

The course in product information and salesmanship will be started this month—at a time when Republic easily can sell every ton of pipe it produces. The program may be extended to distributors of other products made by Republic.

OMI is a series of six sessions, each to be given about a month apart. The first two will deal with selling, the next three with product information, and the sixth will be a review. Nine movies on plastic and steel pipe will be used, plus flip charts and other aids.

Republic's 150 salesmen in the field will conduct the course. Each will preside over at least one series of six sessions. An average attendance of 15 at each meeting is anticipated.

Why should Republic do this for distributors? It recognizes that customers won't always be clamoring for pipe. From OMI, it hopes to gain:

1. **Closer relationship with distributors.**
2. **Better selling by distributors and its own salesmen.**
3. **Better field research work by its salesmen.**
4. **Closer evaluation of distribution problems.**

Sometimes, product information is good, but it doesn't go to the right place.

Minneapolis-Honeywell Regulator Co. wasn't doing a satisfactory job of selling temperature controls for school buildings. It was directing its pitch to contractors before it discovered that school superintendents and school boards had a lot to say about what controls were used, even though they generally are a subcontracted item. M-H changed communication directions and is doing well now.

DISTRIBUTION'S COMMUNICATION NETWORK

3. Get the Order Right, Fast

Speed is a prime aid to communication, especially on order processing. Here's how Holo-Krome Screw Corp., Hartford, Conn., maker of specialized fasteners, does the job on standard orders:

7:30 a.m.—Before the office staff arrives, incoming mail is sorted, opened and stamped with the time received. Orders are separated and sent to the sales department for editing.

8 a.m.—First job of the day: Edit every order, separating standard items from "specials." Same-day service is on standard items; four weeks or sooner on "specials."

8:20 a.m.—While one clerk prices orders from a master price schedule, another checks the accuracy of her figures.

8:50 a.m.—Three billing machine operators type orders on a special invoicing form. A carbon of this—along with the packing slip—is forwarded immediately to the shipping department.

9:25 a.m.—Moving between "supermarket" sliding shelves, an order filler picks up the new Pre-Pak boxes and slaps a label—preprinted with the distributor's name and address—on every box.

2:15 p.m.—Trucks pick up completed orders. Meanwhile, the accounting department completes and mails the invoice to the distributor. Order and invoice go out the same day the order is received.

ucts, for design of products, for new market possibilities.

2. Product Information

Carl F. Oeschle, deputy assistant secretary of commerce for domestic affairs, says: "The volume of advertising of all types has increased since the prewar years from $2 billion to over $8 billion annually. But in relation to consumer expenditure, it is not significantly higher today than it was prewar. Today's volume of advertising may be insufficient to stimulate the sustained high rate of expansion implied in our goal of a $500-billion economy, which calls for an increase in total national output of 30 per cent over the 1955 level. As incomes increase and basic needs are fulfilled, a greater proportion of spending becomes discretionary. A greater relative effort and expenditure in sales promotion and advertising may be required to move to such new high levels of production and consumption."

Advertising is the volume way to give product information, the second in the normal sequence of contacts between maker and user. As Mr. Oeschle suggests, it is probably not being used to its full effectiveness.

Individual selling is part of the product-information contact. A Republic Steel Corp. program (see page 109) represents an attempt to sharpen the product knowledge of salesmen. "When you come down to it," says Mr. Oeschle, "good selling is based on presenting facts about our product."

Product catalogs and stock lists are another major way to bring product information to the user. "But let's keep them simple and let's keep them accurate," pleads a purchasing agent. An engineer in his company designed a product calling for a tricky Z section listed in the warehouse stock list. The warehouse didn't have it. Ten years ago it did, but had dropped the item although it had never combed it out of its lists. Mills had discontinued making the item, too. Result: The engineer had to redesign his product.

Advertising, direct selling, catalogs and stock lists are the three major ways to give good product information. Experts advise: Concentrate on them. Movies, trade show exhibits and other types of displays can also help, but they are usually one-shot affairs.

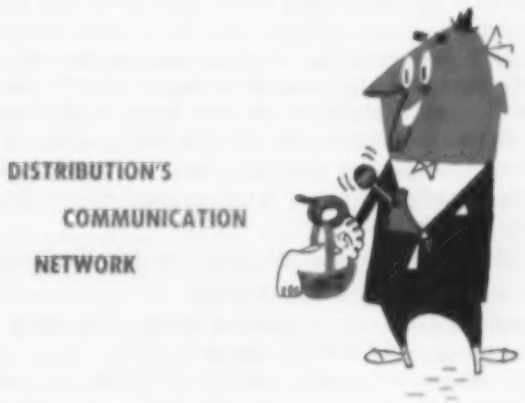
3. Comes the Order

The third normal contact between maker and user occurs when the customer sends in the order. What could be simpler? What could be more straightforward?

Of the 2 million clerical employees estimated to be employed in distribution, most of them are involved at least part of the time in order processing. An estimated $4 billion is spent annually on paper work involved in the distribution of all U. S. products. Much of that is on order processing.

The order has become a mechanical thing. Because it's processed by some of the lower echelons of distribution personnel, it all too frequently is the victim of error.

Experts say this part of distribution's communication network can be improved by both the giv-



4. Make Your Product Talk

One day back during World War II, Howard A. Finch was sitting in a Springfield, Vt., hotel. He overheard conversation about the development of a ship navigating device that did away with the need for complicated mathematics.

For years he had been spending part of his time navigating racing sailboats. He was intrigued—so much so that he eventually went to work for the company involved in the project, Jones & Lamson Machine Co. That product did its talking to Howard Finch before it was fully developed. It was new. It filled a need. The product itself did part of the job of selling.

Another example: In 1950, a new Columbus, O., firm, Industrial Nucleonics Inc., introduced a radioisotope gage to measure and control product thickness in continuous process industries. It was accurate. It filled a need. But its sales were discouraging for three years. "It was like trying to sell $50 bills for $10," recalls Henry R. Chope, one of the company's founders. One reason: This product apparently had to be seen to be believed. Three years had to elapse before enough were in action to do the job of selling themselves. Significantly, since 1953, sales have doubled every year.

5. Speak Wisely on Price

Students of the subject agree that it's wise to put your pricing policies in writing for your salesmen, your distributors, your customers. Here's how Weatherhead Co., Cleveland manufacturer of valves, fittings and related products, states its pricing policy for its distributors:

"Products are available, at the same price, to all franchised industrial distributors. Distribution of price lists covering all standard catalog items, showing both distributor costs and suggested resale price, is carefully controlled, each copy being registered numerically in a particular distributor's name.

"Weatherhead Co. will submit quotations to its distributors on:

"Special items that are not cataloged.

"Unusually large runs of standard catalog items where a change in manufacturing methods effects cost reductions.

"Price changes are effective only when published in dated and revised price schedules. These are announced simultaneously to all Weatherhead industrial distributors.

"Our suggested resale price lists show quantity brackets which are suggested consumer net prices. The distribution of suggested resale prices to consuming industry is the responsibility of the industry distributor.

"Weatherhead recommends the firm maintenance of its suggested resale prices so that our industrial distributors will retain the full profit allowance as established in the price schedules."

ers and receivers of orders if they: 1. Get it right the first time. 2. Get it complete the first time. 3. Get it fast.

4. The Product

Auto makers say that the car on the street talks for them. At a new model change, each manufacturer hastens to get as many cars sold as soon as possible. He knows that the more vehicles he can get on the road, the more talk there will be about them.

Students of distribution say even industrial products should do more talking for themselves. The trend in earthmoving equipment is to streamline tractors and do other things to make the ponderous machinery look more stylish. "It helps sell the equipment," says Harmon S. Eberhard, president of Caterpillar Tractor Co. It's another way of improving the communication network.

The product, too, needs better operating instructions. If it's simple, directions right on the box may serve, even for an industrial item. But take it easy. Brevity can be the road to obscurity.

Instruction booklets often block, don't enhance the communication network. "Most instruction manuals today," charges an advertising executive, "are too long, too complicated, uninformative and atrociously written." The reason is that the job of compiling a manual is too often entrusted to someone who has had little experience with writing. Let your production men or engineers assemble the facts about using your product. Get a writer to write them.

5. The Bill

When you bill a man, you are talking in the potent terms of money. In changing your prices, remember you are communicating with your customer. You can create the wrong impression of your company if you do not act wisely.

Pricing communication with a customer has often gone awry when a price has been cut. Many price reductions are legitimate, stemming from real cuts in production costs. But others result because a company doesn't know its true costs, is clutching at price straws to keep business, is forced to move inventories because of accident or miscalculation, or is ruthlessly trying to get a foothold in a new field. That kind of pricing communications has led to price wars —in some automotive lines, in steel fabrication and other areas— a paradoxical situation in this time of prosperity.

Says Roy C. Ingersoll, president and chairman of Borg-Warner Corp.: "We are not going to get anywhere just by cutting prices. Once we know our companies are operating and producing efficiently, it is our responsibility then to sell our products at prices fair to the public, to our distributors and dealers, to our competition and to ourselves."

A California manufacturer

raised his prices, then left town for two days to avoid the expected outburst from outraged customers. When he returned, there had been just one reaction. A customer called to compliment him on the clear and logical way he had explained the need for a boost. The California man had done a good job of communicating.

6. The Payment

In this part of the communication network, distribution executives face a great challenge. Credit is the basis of the automotive and housing booms. Why should it not play a greater role in industrial selling?

The accompanying exhibit (page 113) outlines some of the considerations in industrial borrowing.

One creative attempt at a new kind of communication in this sixth area faces rough going: Leasing, an infant but promising marketing device for industrial equipment, is being strangled by bureaucratic fiat. The negative approach adopted by the Internal Revenue Service and promulgated in bulletin No. 35 last August is discouraging manufacturers. A STEEL survey shows that 80 per cent of equipment builders with leasing plans are withdrawing from the field, or are curtailing their leasing activities.

During the post-Korean adjustment, machine tool builders and other manufacturers of industrial equipment tried to make leasing a permanent part of our distribution system. Unless and until the IRS comes up with positive and realistic rulings and interpretations, many firms are putting their plans on ice.

Some, however, are going ahead. Kearney & Trecker Corp., for example, estimates that about 6 to 8 per cent of its 1956 volume will come from rentals. Clark Equipment Co. says about 25 per cent of its volume this year may result from leases.

7. The Complaint

Most hope that this part of distribution's communication network is never needed. But if it is, experts advise speedy action. It's estimated that 14 per cent of all

6. Make the Payment

How are your customers going to pay for the industrial products you sell them? Needed is better communication on the courses open in case they haven't got enough cash. Peter E. Heller, vice president of the commercial and industrial financing firm, Walter E. Heller & Co., points out that the most common way out is increased borrowing.

Here is the kind of information customers should have:

You can borrow, generally, in three ways: 1. By acquiring machinery and equipment under time purchase contracts. 2. By using revolving credit to finance your accounts receivable. 3. By pledging inventories.

Should the equipment be purchased or leased? These are technical and tax questions that should be governed by the operating position of the company, what use it will put the equipment to and for how long it expects to use such equipment. Renting should not be overlooked in considering acquisition. Should you determine that leasing is preferable, be sure that you can write off your rental payments against your operating income.

Should you wish to buy rather than rent, compare your depreciation rate against your rental expense and both of those against the useful life of the equipment. Generally assume that on a purchase you will be required to put up a down payment of between 20 and 30 per cent.

The use of revolving credit to finance accounts receivable is growing in importance for industrial firms, says Mr. Heller. What you establish in this financing medium is a continuing and revolving source of funds predicted upon your outstanding accounts receivable. Such credit is usually given by commercial finance companies. In practice, you use these funds as capital. Funds are advanced under two methods—by pledging your accounts receivable, which is a borrowing, and by factoring, which is a sale.

Inventories also can be used to secure funds which are revolving and continuing. Your inventories are normally placed in a public or field warehouse. Receipts and releases for commodities stored are issued by the warehouseman. Funds are advanced to you immediately upon the delivery of the warehouse receipt and repaid upon release. The only commodity usually excluded from this program is work in process.

To secure an adequate cash flow, combine receivable and inventory financing, using the funds generated through the medium of accounts receivable to pay back what is taken out of inventory.

DISTRIBUTION'S COMMUNICATION NETWORK

7. Solve the Complaint

The most effective way to improve this channel of communication is to eliminate it.

Caterpillar Tractor Co. forestalls possible complaints this way: If necessary, it will make parts no longer in production for its older earthmoving equipment. The user is charged a price comparable to the sum asked for a similar component that is in production. Because the production run on the old part is so low, or because dies have to be remade, the cost will probably be several times what is charged. But that expense is written off under the heading of improved communications with the customer.

Sometimes action on a complaint leads to some unexpected and welcome improvements in other lines of communication.

A silverware manufacturer received many complaints from retailers who objected to the expense of inventorying his slow-moving product. The manufacturer agreed to warehouse the silverware himself in regional locations. The retailer now just has samples, but can teletype to the nearest stocking point for 24-hour delivery.

Besides making the retailers happier, the manufacturer has discovered a happy by-product. He's closer to his customers because he better understands what quantities they want, when they want them.

lost accounts can be traced to unadjusted grievances.

Integrating Distribution

Improving the communication network will integrate distribution. Moves like Republic's (page 109) will bring the independent distributor onto the team.

He often feels like the forgotten man. A survey by STEEL indicates that 71 of 100 responding distributors want closer co-operation with their manufacturers. Independent distributors are becoming more important in the marketing system. As an indication, the American Machine Tool Distributors' Association estimates 125 tool distributors were in the field in 1939, compared with 240 now.

Avoid the Mousetrap

You will have to have more than just a good product to be successful. Studebaker-Packard Corp. is one of the latest companies to have that forcefully brought home. Automotive men agree that the corporation's cars are well designed, well engineered, efficiently manufactured. But customers aren't beating a path to S-P's door to buy them. An inadequate distribution setup is a major cause of the troubles. S-P figures it needs 2 per cent of the market to break even, but last year it won only 0.86 and the percentage is even lower this year.

Just before the merger of Studebaker and Packard, the man who was to become president of the combination, James J. Nance, was perhaps prophetic when he said:

Bridge—"Today we have the largest and most efficient physical plant for the production of goods in this nation's history. The American consumer is in a strong financial condition. The two can only be brought together by distribution, the conveyor belt between production and consumption. After 13 years of disuse, this is the one great weakness in our picture. The newer generation of businessmen must learn the arts of distribution."

T. V. Houser, chairman of Sears, Roebuck & Co., echoes that thought when he says the subject "thus far has received inadequate attention by the technician." He and other students of distribution point out that the overwhelming majority of all products introduced fail. The major cause for the failure: A miscalculation of the size and scope of the market, coupled with the inadequate dissemination of information about the product once it's available.

Summary—In the case of most product failures, distribution's communication network has failed. Case's Clay Hollister believes improvements in communication will come quickest if the difficulty is attacked at the seven normal contacts between maker and user. He suggests employing the industrial engineer's approach to work on the problem in this sequence:

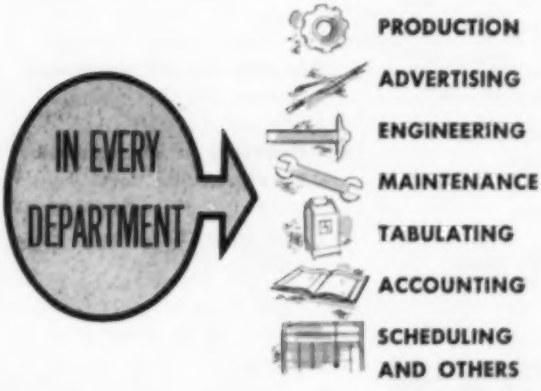
1. You eliminate everything you can eliminate. (Example: Less red tape in order processing.)
2. You improve the remaining steps. (Example: Sharpening of communications all along the line.)
3. You get someone to do part of the distribution job for you. (Example: Hiring an outside firm to do some of the marketing research.)

That's the routine industrial engineering has applied so successfully in improving manufacturing processes. It may relieve the corporate menopause many companies are now suffering in distribution.

are you profiting through planned individual order control?

GET YOUR FREE COPY OF THIS NEW FULLY ILLUSTRATED FOLDER!

This full color folder, just off the press, shows in detail various methods of providing effective control of all orders within your plant.



Wherever a schedule has been established for the purpose of meeting a deadline, control is a "must." This folder illustrates the means for effective control of all planned orders:

customer sales orders • internal parts orders • maintenance or repair orders • tooling orders • engineering projects

Don't miss the opportunity to get "What Has Happened To Order #2261?"—the folder which shows in detail a positive means of depicting progress against a prearranged schedule.

In every plant, most departments must schedule orders, jobs or projects. This folder illustrates exactly how individual order control is maintained.

Write today for this new folder. Ask for KD774—"What Has Happened To Order #2261?" Remington Rand, Room 1565, 315 Fourth Avenue, New York 10, New York.

Remington Rand
DIVISION OF SPERRY RAND CORPORATION

THE ELI WHITNEY METROLOGY LABORATORY

Your NEW Auditing Source For Dimensional Standards

For a more comprehensive account of the facilities and capabilities of the Eli Whitney Metrology Laboratory, request Bulletin ML-1-56 from The Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 17.

American industry now has a new auditing source for dimensional standards at all precision levels.

In a maximum controlled environment—using instruments similar to those of the leading national standards laboratories of the world, the Eli Whitney Metrology Laboratory offers the following services:

1 Calibrate and Certify:

- Dimensions of gage blocks, mechanical components and fixed size master gages including thread gages and threaded parts.
- Flatness and surface finish of optical true planes.
- Material hardness.
- Fineness of textile fibers.
- Circularity and graduations of precision circles—also circularity of manufactured components.
- Boundaries of contoured masters.

2 Provide a counseling service for the development of industrial dimensional control and gage surveillance programs.

GOLDEN ANNIVERSARY

SHEFFIELD

manufacture and measurement for mankind

7482

Technical Outlook

HIGH SPEC STEEL—Green River Steel Corp. is using the Dornin process to make 4340 that meets the most stringent specifications ever written by the aircraft industry, George H. Dornin Jr. told the AISE in Baltimore. One spec calls for a transverse tensile of 260,000 to 280,000 psi, with a reduction in area of 13 per cent. Sections up to 14 in. square are furnished. Primary object of the Dornin process is to remove the segregation zone that forms in a killed steel ingot.

DESIGN UNLIMITED—Another note from AISE meeting: Harry S. Beers, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Claymont, Del., reported that flanged heads are available in almost any conceivable shape. Flanged and flanged and dished heads in both standard and special shapes are being used in many machine and mechanical designs other than boilers, tanks and pressure vessels. This has added to the requirements for closer tolerances on contour than was thought possible a few years ago, Mr. Beers said.

FAST CUT—Milling the wing spars of F-100 Super Sabres is easier with a gang cutter. Cutters are made in sections, each of which has several helical carbide inserts. The sections are ganged and stepped to produce the correct contour. North American Aviation says it gets a 20 microinch rms finish with a minimum of hand work.

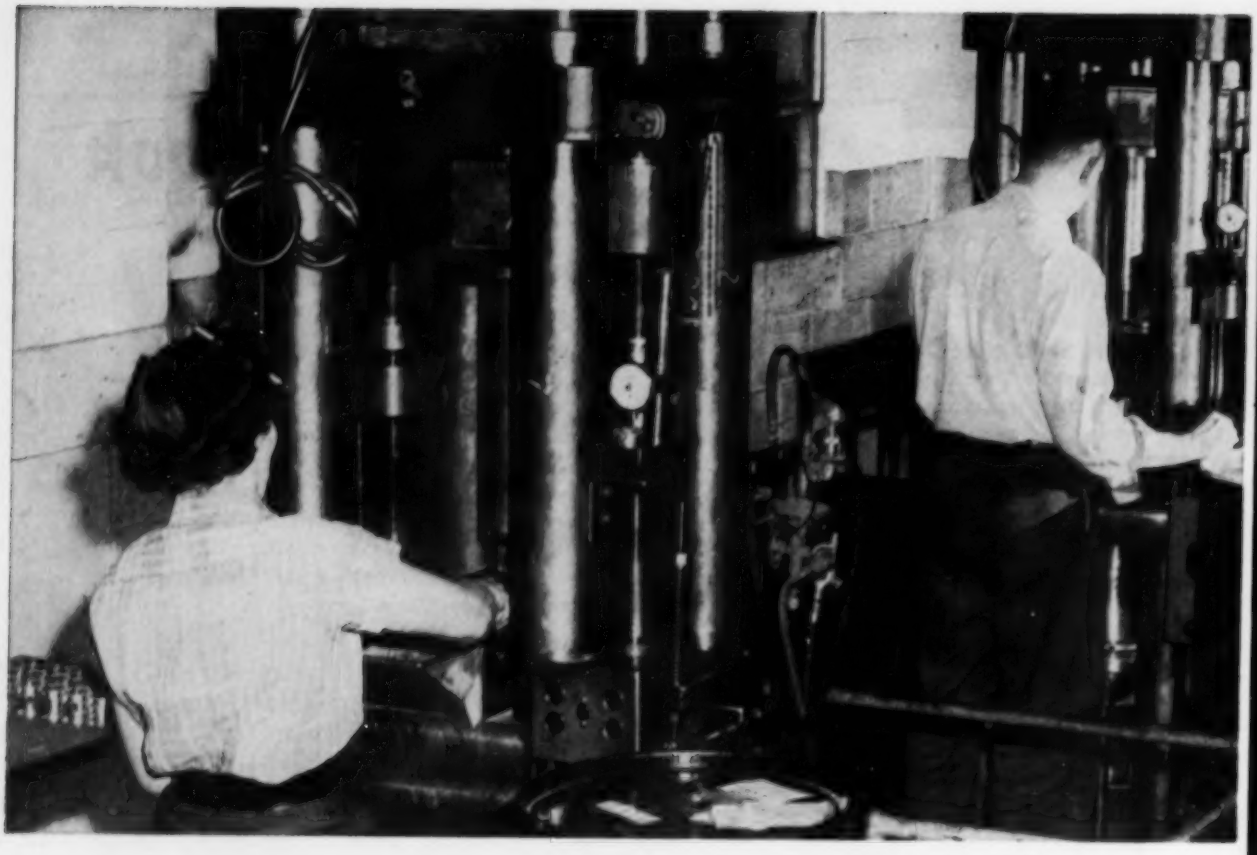
SINTER PLANT SET—Work begins this month on U.S. Steel's new sintering plant at Homeville, Pa., 12 miles south of Butler. The plant, with three units, will process about 15,000 tons of ore daily. Each machine is 8 ft 3 in. wide, 200 ft long and 50 ft high. Built at Dravo Corp.'s Neville Island plant, near Pittsburgh, each machine is basically a traveling grate containing 110 individual cast iron sections. Ore, blended with fine coke and other materials, is loaded continuously on the grates, forming a bed about 12 in. thick. The mixture is ignited from top by gas. The material burns as it travels 200 ft through the machine. The mixture fuses into large clinkers, is discharged and broken into smaller pieces.

DUST BARRIER—Tiny particles of air-borne dust may be a hindrance to travel in outer space, according to researchers at Armour Research Foundation. To study this problem and the erosion of metal surfaces caused by heat from air friction, ARF engineers have developed a way to accelerate fine dust to more than 7000 mph.

SODIUM-REDUCED TITANIUM—In its new Ashtabula, O., plant, Electromet is producing titanium sponge by sodium reduction. It's the first use of a process other than magnesium reduction in this country. The plant expects to turn out 7500 tons annually.

CAST IN GLASS—A precision, metal casting method that uses one-piece glass powder molds has been announced by Corning Glass Works. Known as the Glascast disposable pattern process, it uses a wax pattern. The pattern is dipped into a Glascast slurry, coating it with glass grains. Repeated dipping builds up the mold shell. The assembly is fired, the pattern is simultaneously removed. Developed for close-tolerance parts made of high temperature alloys, the molds are said to produce surface finishes of 20 to 40 microinches, tolerances of ±0.005-in.

Metalworking Outlook—p. 61 Market Outlook—p. 193



You can cut scrap, insure quality and increase profits with . . .

Process Controls for

GETTING the most out of powdered metal depends on effective controls. Every step, from the mixing of the raw material through sintering, must be predetermined, checked and controlled if you expect good parts at a cost you can afford.

Ferro Powdered Metals Inc., Salem, Ind., has a process control system which is integrated with production and quality control to insure high quality and low scrap. The five steps it recommends may be the answer to your problems:

Supervision—You can't get effective process controls unless top management is behind them. The supervisor works better if he reports directly to the chief manufacturing executive.

You invite trouble if you underestimate the need for a control program—an ever-present danger when everything rolls smoothly. When scrap goes up, operating personnel are usually ignoring controls.

Raw Materials—The quality of raw materials directly affects the quality of the finished part. The first step is to agree with your supplier on physical and chemical properties, and the precise method that will be used to determine them. ASTM methods are quite satisfactory.

Don't release raw material for production until the sample analyses are back from the laboratory. Test for apparent density, flow, chemistry, sieve, etc. Spectrographs and x-ray analysis are well worth the effort.

Process a standard test specimen as a final step. This will determine growth, shrinkage, porosity, hardness, density, etc.

Mixing—Ferro's mixing record form is on page 119. A visible record with each batch eliminates guesswork and reduces mistakes. Such records can be worked in with inventory control. A file is invaluable

Step 1 Control your raw materials. The lab (above) is checking powder composition, measuring impurities. Operator (below) is determining the apparent density using ASTM's method (B 212-46)

Powdered Metals

as a double check on laboratory control.

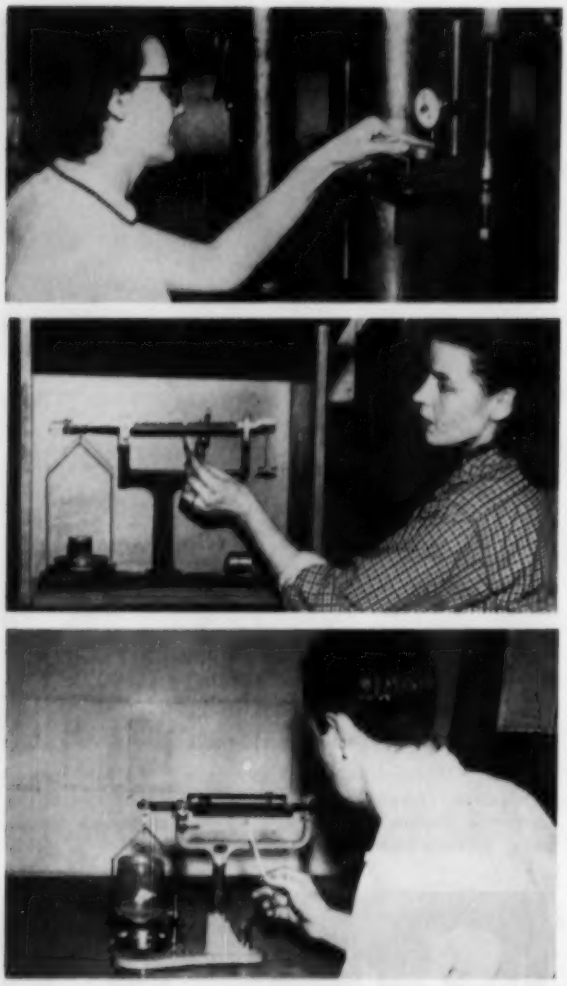
Batch weight and mixing time are best determined by a pilot run. Timers should be used as much as possible to insure accurate repetition and uniform composition.

Be sure to label each container and relate it to a process record (see page 121). Color codes are especially useful in preventing accidental contamination.

Briquetting—Most operators agree that the cornerstone of a successful operation is briquetting. It is also the most critical. A pilot test is absolutely necessary in obtaining control standards and operation limits.

The most important data are entered on the process record and filed. Factors listed should be checked about ten times an hour. The most important checks are made immediately after setup. Briquetting height, for example, depends on several factors, in-

Step 2 Control your mixing. Each container (above) is carefully marked and the powder mixture blended by weight. Ferro's Mixing Record (below) has plenty of room to note important information



Step 3 The cornerstone to success: Control the briquettes. The girl (top) frequently checks briquette height with a dial indicator mounted on the press. Weight (center) and density (bottom) must be considered, too

cluding press motion, fill and pressure. A good check is a simple dimensional measurement with a dial indicator. Remember that the best check is nullified if the sides are out of parallel.

Out-of-parallelism is common in powder metallurgy because all members of a press deflect under pressure. The uneven filling action of the press shoe is another factor.

Briquetting weight depends on powder flow, apparent density of the powder, powder size and the press. In briquetting, the volume of the die cavity is constant. The mechanics of filling is a constant.

Weight must be considered with height. Such checks are easy to make on the production floor. They are not a substitute for density control.

Density — Progress in powder metallurgy owes much to metal systems of variable densities. The ratio of weight to volume is called density and it is an inverse evidence of porosity. As porosity increases, density decreases.

Many of the industry's standard testing and operating methods are available in pamphlets from the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. For instance, the standard method for testing the density of a metal powder is described in ASTM B 212-46. The apparatus is a funnel and a cup (which holds exactly 25 cubic centimeters). The powder is dried for 1 hour at 215 to 225°F, cooled to room temperature and chemically dried. The powder is placed in the funnel and allowed to fill the cup so that it overflows completely. A spatula levels the contents with the top of the cup. Contents are carefully weighed (weight in grams is multiplied by 0.04). The result is the density in grams per cubic centimeter.

Briquettes and completed parts are also weighed in water—a standard laboratory procedure.

Sintering—Ferro believes that the furnace atmosphere is as important as the control of the time-temperature cycle. Again, pilot tests are necessary to establish controls.

Step 4 Control the sintering. Typical GE panel like the one above controls temperature, time and atmosphere.

Ferro also believes in dewpoint control to minimize decarburization, conducts frequent checks like the one above

Up to sintering, errors can be rectified by regrinding the green briquettes. Deficiencies in sintering result in total loss of the material. Offstandard time and temperature cycles should not be used to rectify raw material or briquetting errors.

Recording pyrometers give the best record of temperature control and the historical records are an advantage in eliminating recurring errors.

Accurate time control is important. For intermittent sintering, time clocks work quite well. For continuous operations recording tachometers are highly recommended.

An atmosphere must prevent the formation of oxides. For iron, controlled dewpoints prevent decarburization. You can determine this with commercial equipment like the Alnor Dewpoint meter.

The gases you use in an atmosphere depend, of course, on the materials being sintered. Hydrogen is widely used for cemented carbides and steel. Dissociated ammonia is more widely used. The most common atmosphere is a combination of nitrogen, hydrogen, carbon monoxide and carbon dioxide. It is obtained from incomplete fuel combustion in endothermic and exothermic gas generators.

Tools—Without an adequate system for controlling tools there can be no adherence to close dimensions. This is especially true of complex shapes.

Tools for powdered metals wear out rapidly. To combat this, a tool storage area, and a complete inspection and maintenance layout are necessary. Inspection tools include micrometers, gages, comparators, surface plates and hardness indicators.

Keep tooling in complete sets rather than as individual parts. Dies, for example, consist of a die, upper and lower punches and a core.

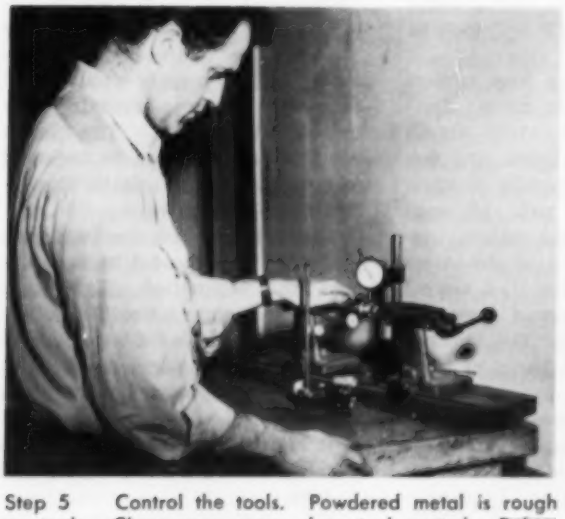
Identify your tools with distinctive markings. Number and letter systems, card indexed, are a must. Color might be used to identify the type of material specified, such as red for bronze and yellow for brass.

The only basic rule at Ferro is that no tool is released for use until it has been completely inspected. All new tools are inspected and sealed with plastic before storage.

Take a careful look at your operation. A cost reduction program can't have a better foundation than better tooling.

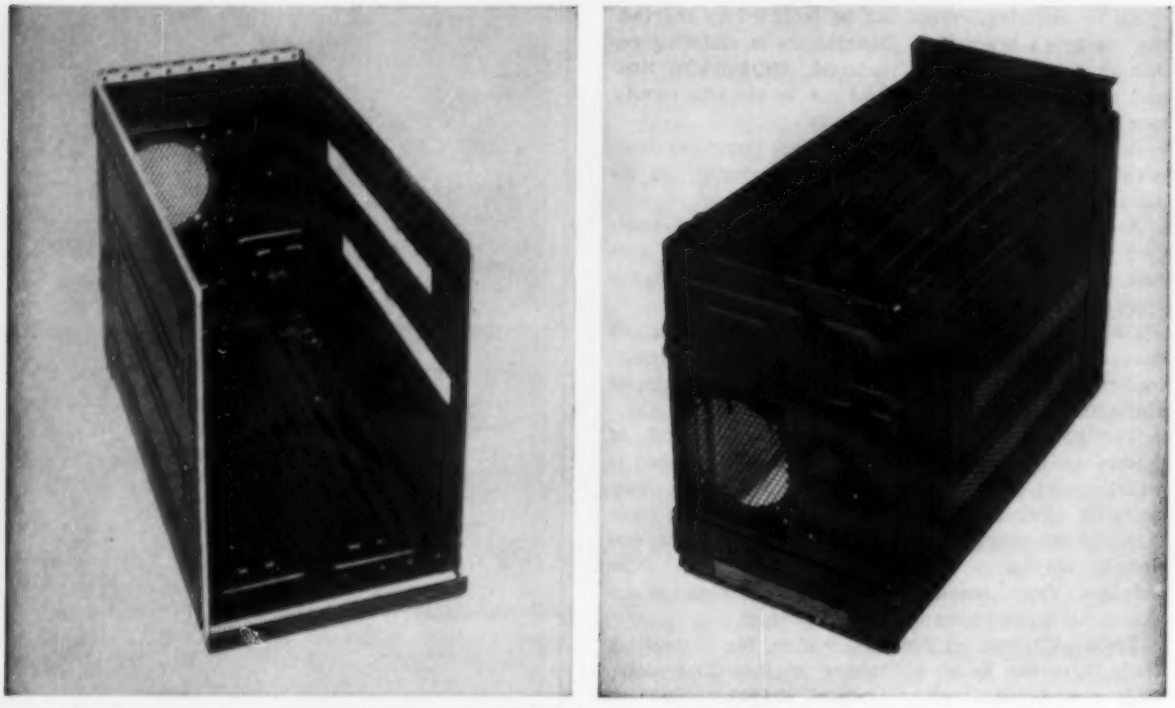
Ferro records every step of its powdered metal process from raw material to the testing of finished parts. Forms are filed for reference

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service* STEEL, *Penton Bldg., Cleveland 13, O.*



Step 5 Control the tools. Powdered metal is rough on tools. Close specs mean close tool control. Before

tools are removed from crib, they should be checked with good gages like these (left and right)



Cooling water flows through built-in tubes in the sides of this electronic case. It's an example of how to . . .

Design for Heat Transfer

PICTURE the leading edge of an airplane wing made of a metal sheet with a heating or cooling agent pumped through a tube pattern within it.

Picture a gas tank as an integral part of the wing. A sheet can be bonded around the edges and the whole center expanded into a tank instead of making tubes.

Those and the list of applications in the table on the next page are potential uses for Roll-Bond metals, says Olin Mathieson Chemical Corp.

Start—First talked about a little over a year ago, OM's sheet is a new form of bonded metals. It's made by creating tubelike passageways within two or more layers of metal which have been roll-bonded together.

The product was developed in co-operation with the Frigidaire Division of General Motors Corp. Heat transfer was the idea in mind, so the first use was in refrigerator evaporators.

Production—Here's how typical refrigerator stock is made: Flattened pieces of 2S (1100) aluminum, about ⅛-in. thick, are mechanically and chemically cleaned.

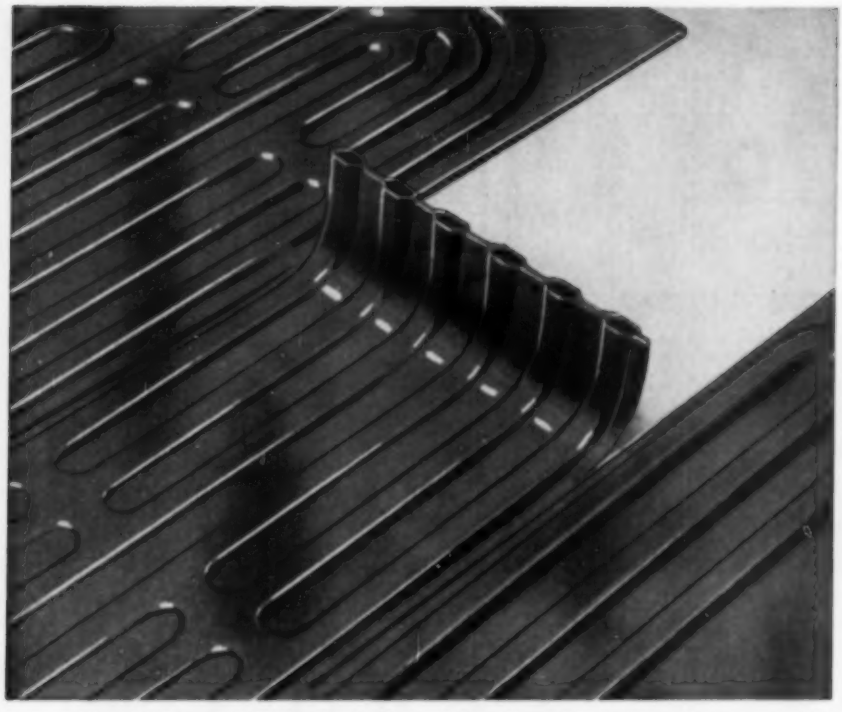
One side of a pair of such plates has a stopweld pattern (applied with a stencil or by some other transfer method.). A second cleaned sheet is placed over the one with the design. The two are spotwelded to hold them in position.

The sandwich is heated in a furnace to the rolling temperature, then passes through a set of rolls for the first reduction. Inner surfaces are sealed, and the plates develop a homogeneous bond. Microscopic examination shows that recrystallization takes place at the interfaces—there is grain growth through the entire bonded area.

Cold rolling may be used to size the sheets for more accurate longitudinal dimensions. The finish rolled sheet may then be annealed to soften it and to assist the inflation of passageways.

Tube Forms—The sheet end with the entry tubes is cut back to expose the lamination. Tubes are opened by using a small, air-operated punch. A steel dilating needle is inserted, and the bonded sheet is placed between two flat platens in a hydraulic press. A water hose is attached and the plates are inflated with pressures from 1000 to 4000 psi.

After inflation, passageways are



Olin Mathieson Roll Bond aluminum (above) used in electronic case at left. Reynolds Metals Co. has announced an aluminum sheet with one side flat and a tubed pattern on the other

flushed with water, steam and dry air. This cleans out the stopweld material and removes moisture from the passageways.

Strength—Since the tubelike passageways are inflated with pressures up to 4000 psi, units can be expected to stand any normal working pressure without failure.

Heat conductivity of 100 per cent can be expected, too, because there are no voids, solder or brazing compound in the bonded area.

Design is flexible. Olin Mathieson says that if a design can be drawn on a piece of paper, chances are good it can be reproduced in metal.

Cost—Transfer screens used in producing the designs cost about $50. They will turn out as many as 20,000 units.

Type of metals: Olin Mathieson says if it can be hot and cold rolled, it will work in the roll-bonding process.

Many aluminum alloys are suitable. Copper and alloys with more than 85-per-cent copper are satisfactory.

Future Materials—A development engineer at Olin Mathieson says: "We have every reason to believe that other metals—steel, stainless, etc.—can be roll-bonded and inflated successfully. Experimental work is progressing along these lines."

The thickness to which metals can be roll bonded varies widely. Experimentally, finished gages from 0.010 to 0.500-in. have been made. The most suitable gage depends on several factors: Design, pressure requirement, size of plate and alloy used.

Inflating a roll-bonded product on one side only presents some problems. However, successful combinations have been produced.

A number of experimental multiple-layer (three to six) designs have been made. Within limits, independent systems can be produced between each pair of adjacent layers. With proper design, a honeycomb or corrugated effect in the internal layers will increase the stiffness and structural strength many-fold.

Buildings—Construction is market that built-in-tube producers expect to develop as a big outlet for their product. Panels for air conditioning and heating and others containing water, gas and electric lines are being studied.

Reynolds Metals Co. makes an aluminum "Tubed Sheet" similar to OM's product, which also is being used in refrigerator evaporators.

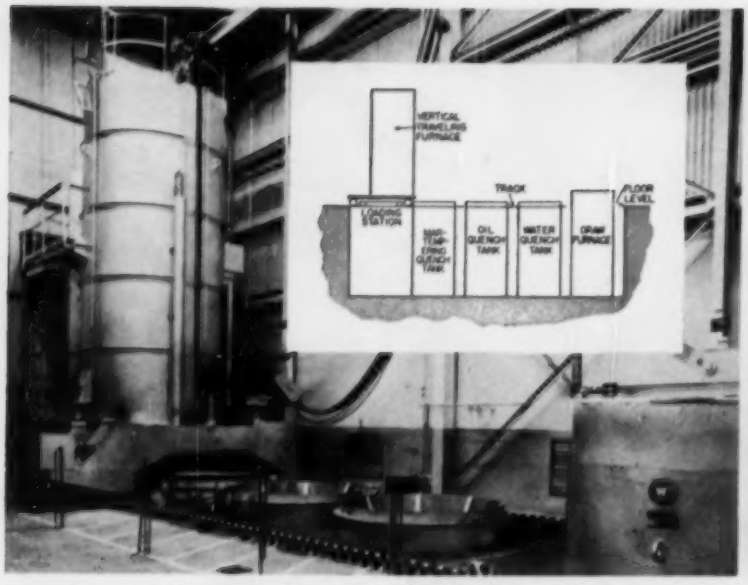
In January, Revere Copper & Brass Inc. announced its "Tube-in-Strip" product (STEEL, Jan. 23, p. 76). It's being rolled in copper, brass and aluminum. The strip is shipped uninflated—the customer can inflate it easily.

Just how big the market is for sheet and strip with built-in tubes is undetermined. But there should be good business for all.

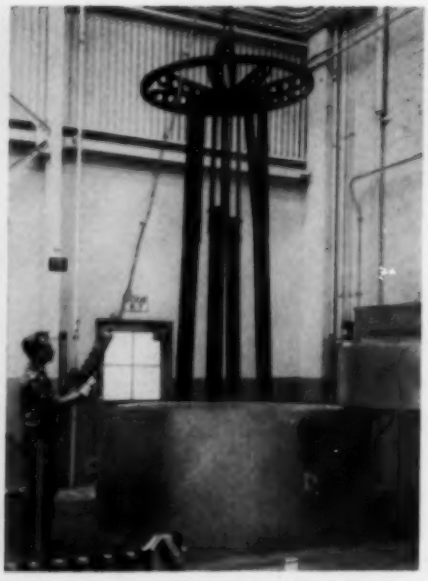
Uses for Roll-Bond Metals

- Air conditioning—evaporators and condensers
- Aircraft sections—structural and heat exchangers
- Containers—Cans and floats
- Doors
- Flooring in trucks for heat exchangers side wall and roof plate
- Home freezer shelves and display case evaporators
- Immersion heaters
- Oil coolers, including automatic transmissions
- Plate coil heater exchanger
- Auto radiators
- Radiant heating units
- Refrigerator evaporators
- Solar heating collectors
- Structural shapes and wall panels
- Water coolers
- Condensers—all kinds
- Water sprinklers
- Transformer cooling panels
- Ice cube freezer plates
- Hollow bus bar

Source: Olin Mathieson Chemical Corp.



Boeing's vertical heat treat line. Traveling furnace is moving from martempering quench tank to loading station



Placing a charge into the draw furnace. Note spider support ring

Heat Treat Line for Aircraft Steels

By W. J. HOPPE and L. R. FITCH
Seattle Engineering & Service Dept. Westinghouse Electric Corp. Seattle, Wash.
Senior Facilities Engineer Boeing Airplane Co. Seattle, Wash.

BOEING's new heat treat line, designed to handle aircraft-quality steel bars and other long shapes of various cross sections, offers three big advantages: Minimum distortion of parts, complete quench control and space savings.

In the installation are a loading station, a Westinghouse vertical traveling elevator furnace, three quench tanks (martempering, oil and water), a pit-type draw furnace, an Endogas generator and control panels.

Operation—A shop crane places material to be heat treated on a spider support ring at the loading station. The traveling furnace moves over the charge and the hoist hook (connected to a roller chain passing through the furnace roof) raises it into the furnace.

The furnace is moved over the quench tank during heating so the charge can be lowered quickly at the end of the cycle. After unloading, operators move the furnace to the loading station to take on a new charge.

Furnace — The vertical furnace has a charge space 5 ft in diameter and 14 ft high. Three-zone heating is provided by a 105-kw heater in each zone. Maximum work load is 4000 lb at 1600°F or 1000 lb at 2050°F. Heat-up time varies with the loading.

A 15-kw motor-generator set powers the 1½-hp, direct-current travel motor and the 25-hp, direct-current hoist motor. Hoist speed is variable; travel speed is 7.5 fpm. The bottom door, which closes on an asbestos rope seal, is opened or closed in 16 seconds by a 1½-hp, alternating-current motor.

Quenches — The martempering quench tank operates at 100 to 400°F; eight, thermostatically-controlled, 10-kw heaters are used. Even temperature throughout the tank is maintained by a 7½-hp motor-driven agitator which recirculates the oil. For cooling, air is forced through tubes between the inside wall of the main tank and a baffle.

The oil quench tank operates at 100 to 125°F. Three 10-kw heaters are used. Even temperature is maintained the same as in the martempering tank. For cooling, oil is circulated through a water-cooled heat exchanger.

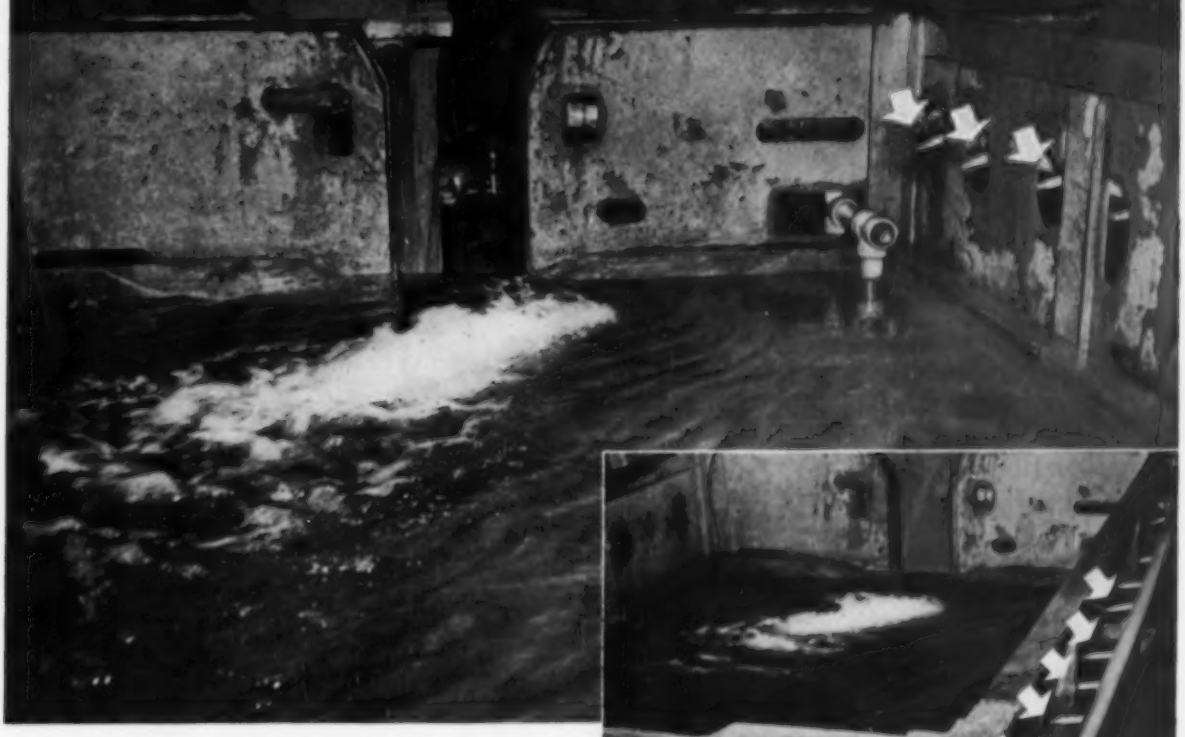
Even temperature in the water quench tank is maintained by the same means as in the other tanks. Cold water is added for cooling.

Draw Furnace—The charge space in the draw furnace is the same size as that in the elevator furnace; maximum workload is 4000 lb at 1450°F. Each of the three zones is heated by 75 kw. Heat is controlled to ±10°F throughout the working range.

A 10-hp fan recirculates air in the furnace to maintain an even temperature. The furnace cover closes on a sand seal. It is raised manually by a counterbalanced handle and turned to clear the furnace opening.

Atmosphere — The Endogas generator has a capacity of 2000 cfh, is heated by 24 kw to a maximum of 1950°F and has an air-gas ratio of 7.2:1.0 (volume 1160:161) using raw fuel gas (propane).

FOR AN ACID CONDITION, THERE'S NOTHING LIKE
U. S. Uscolite Plastic Pipe



Uscolite nozzles (arrows) are used to wash acid off steel stock.

Close-up of Uscolite pipe which carries water to the Uscolite nozzles (arrows). The tanks are lined with U. S. corrosion-resistant Permobond rubber lining.

A large manufacturer of wire and cable in New England is one of the many who find U. S. Uscolite® Pipe immune to acid conditions. "Uscolite is the most effective material we have found for this service," says the management of the plant. Uscolite pipe and Uscolite nozzles are used to wash off acid after cable and wire are immersed in pickling baths —for two big reasons:

(1) Uscolite is immune to corrosion from the splash-drip and spray off the steel stock as it comes from the pickling bath.

(2) Uscolite nozzles not only last far, far longer than metal nozzles, but they also require no clean-out.

Uscolite piping is a product of United States Rubber Company. Both its interior *and* exterior are resistant to acids, salts, alkalies, gases. Despite Uscolite's great impact strength, it is surprisingly light in weight. You can also order it in pipe fittings and valves.

Whether ordering completely new piping, or getting replacements, specify U. S. Uscolite. Get in touch with any of the 27 "U. S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

Uscolite pipe and fittings are made in the broadest and largest line of stock sizes on the market. Sizes follow:
● Molded fittings in ½" through 4" I.P.S. ● Molded flanges ½" to 6" I.P.S. ● ½" to 3" Uscolite diaphragm valve (Hills-McCanna). ● Pipe in standard wall dimensions and extra heavy wall dimensions in ½" through 6" pipe sizes.

Mechanical Goods Division

United States Rubber

Two new plants the size of this 12-ft zinc sintering machine promise . . .

More Sinter for the Blast Furnace

Discharge end of Blackwell Zinc's 12-ft bed sintering machine. The know-how Koppers Co. gained on this giant will be used in building two new iron ore sintering plants

CAPITALIZING on its know-how in building giant sintering machines for zinc concentrates, Koppers Co. Inc., Pittsburgh, will build two for iron ore which have 12-ft-wide beds.

Weirton Steel Corp., Weirton, W. Va., which has the first machine to be built with an 8-ft bed, will get one of the plants. The other will be installed at Great Lakes Steel Corp., Zug Island, Mich.

Largest—Koppers also will build extensive raw ore and sinter handling systems at each plant. The American Ore Reclamation section of Koppers' Freyn Department will do the designing, engineering and construction.

Great Lakes's machine will have an effective length of 199 ft 6 in. Weirton's machine will be 168 ft long. The area of the machine bed at Great Lakes will exceed that of any sintering machine for any ore.

Problem—First task of Koppers officials was to overcome initial resistance to crossing the "8-ft barrier" in sintering machine width. The firm has built a 12-ft-wide sintering machine for Blackwell Zinc Co. Inc., Blackwell, Okla., (see photo above), but zinc ores don't have to be maintained at the high temperature of iron ore. The problem of the heat effect on the machine is less acute.

Officials and engineers of National Steel visited Blackwell to see the 12-ft zinc sintering machine in operation. They liked its possibilities for iron ore sintering.

Air-Cooled Sinter—Koppers' engineers will solve several problems in designing the two plants. One is achieving even distribution

USG® BRUSHES
work in a steel mill . . .

for every Steel Mill job—the right brush* specification

THE JOB	THE BRUSH
Mill Motors	USG Grade 135
DC Crane Motors	USG Grade 223
Diesel Main Generators	USG Grade AY 32 or 2306
Diesel Switcher Traction Motors	USG Grade 2207
Welding Generators and Exciters	USG Grade AH 897
Tin Line Collector Rolls	USG Grade 1658

THE JOB	THE BRUSH
Tin Line Generators	Grade on request
Cleaning Line Generators	Grade on request
DC Generators (DC Power Supply)	USG Grade 232
AC Crane Motor Slip Rings	USG Grade 550

*All USG brushes can be obtained with STATITE®, the permanent shunt connection, needing no hammerclips; cannot be jarred loose or pulled out.

Write for your copy of the complete USG Brush Catalog.

211

THE UNITED STATES GRAPHITE COMPANY
DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

of ore over the bed. Another: The sinter must be properly cooled after it leaves the machine. The trend among equipment producers is toward air-cooled sinter. That's the technique Koppers will use at Great Lakes and Weirton, after breaking the sinter as it leaves the bed.

Koppers expects the Weirton machine to produce about 6000 tons of sinter daily. The longer Great Lakes machine will produce over 7000 tons a day.

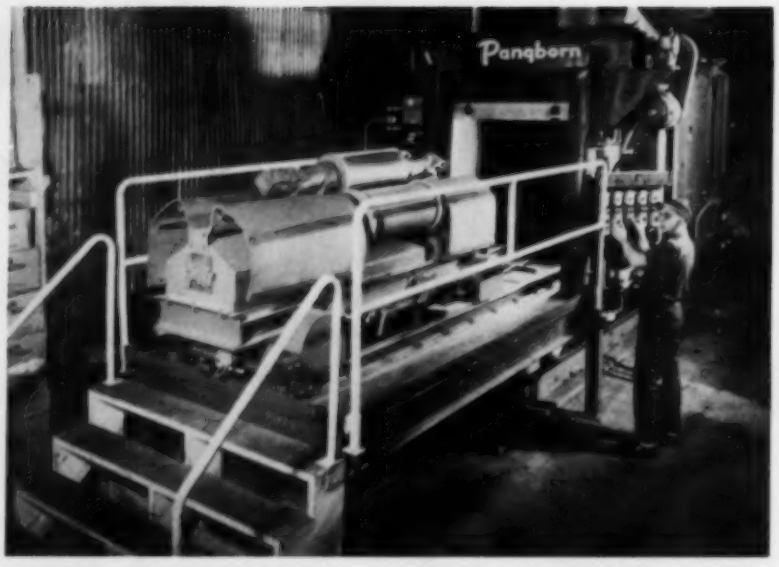
Selling Points—One advantage of having one 6000-ton machine instead of three 2000-tonners in your plant is reduced labor costs. Less space is needed with one large unit—important in many crowded mills. Maintenance costs will be slightly lower, and there can be a saving in cost of utilities.

Probably the predominant motive behind expansion in sintering is the belief that the agglomeration of the fines in the charge can boost blast furnace production. Some steelmakers say they can boost output 20 per cent by this method. Koppers officials and many steelmakers will agree that sintering is necessary, since American and foreign ores now show increased percentages of fines.

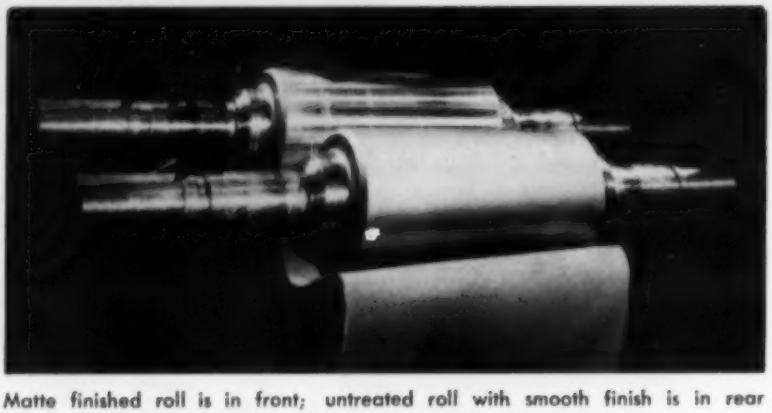
Further savings are possible in coke rate per ton of pig iron (see STEEL, Jan. 16, p. 79). It's reported that each 10 per cent of sinter (replacing materials which should have been sintered) will bring about a coke rate reduction of 40 to 50 lb per ton of pig iron.

Development—A feature of the sintering plants for National Steel Corp.'s subsidiaries is the mixing of limestone with iron ore before it's sintered. Blast furnace operators will experiment with several percentages of limestone in the sinter to determine the point of maximum return.

Koppers will design complete material handling facilities for both plants. The firm will build more than 70 individual conveyors at Great Lakes Steel to bring raw materials into the plant, distribute them between three ore yards and bring them to the sintering plant. A pushbutton control from a central location will guide the entire operation. A master panel will indicate the performance of each belt.



This 24-in. roll was placed on the carriage of the blasting cabinet by a lift truck with a special boom. After masking bearing ends, the operator starts rotating the roll on the carriage. Movement into the blast cabinet, abrasive blasting and carriage return are automatic



Matte finished roll is in front; untreated roll with smooth finish is in rear

Mill Rolls Get Fast Blast

MATTE FINISHES are blasted on mill rolls at Thomas Strip Division, Pittsburgh Steel Co., Warren, O. After blasting, the rolls are ready to roll a matte surface on steel strip when customers want it.

A side benefit: The matte surfaces left by the blasted rolls prevent sticking of coiled strip during annealing, which sometimes occurs with smooth finished strip.

Pushbutton Operation—A roll is loaded onto the work car and the automatic cycle initiated by two pushbuttons.

The work car travels into the chamber, stops and the door closes. Blasting starts and the car travels through the blast stream until it gets to the door of the cabinet. Blasting stops, the door opens and the car emerges to its original position.

Fast Blast—The cycle lasts less than 3½-minutes. Time under the abrasive blast is 45 seconds.

Roll blasting in the Pangborn equipment permits speedy return of mill rolls to service. Lowered costs will pay for the equipment quickly, say company officials.

fluxstone

...buy it to better advantage from Chemstone

Steel producers are in line for three-fold advantages when they make *fluxstone* synonymous with Chemstone.

Dependable Deliveries—Chemstone's multi-plant setup and great capacity (with integrated transportation facilities) insures dependable, uninterrupted deliveries coordinated with your production schedule.

Time-honored Quality—Chemstone products are noted for uniformity of size, tight adherence to specifications, controlled top quality that has been traditional over the years.

Expert Technical Service—Skilled assistance from steel-wise Chemstone men is always available.

Free: The full story of how Chemstone—and its affiliate, Minerals & Chemicals Corporation of America—is geared to serve you is yours for the asking. Use the handy coupon for fast service.

WORLD'S LARGEST NON-CAPTIVE FLUXSTONE PRODUCER

Chemstone
CORPORATION
LEADER BUILDING, CLEVELAND 14, OHIO

a subsidiary of
MINERALS & CHEMICALS CORPORATION OF AMERICA

Pittsburgh, Pa. Representative:
NEVILLE LIME COMPANY

CHEMSTONE CORPORATION
Leader Building, Cleveland 14, Ohio
Please send me:

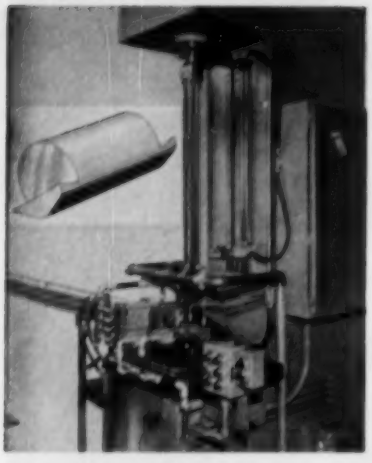
- ☐ 16-page bulletin that tells the Chemstone-M&C story
- ☐ Price and product details about Fluxing Limestone

name _____ title _____

company _____

address _____

city _____ zone _____ state _____



Cam sprags roll off at . . .

1000 an Hour

A LARGE automotive parts supplier is broaching 24 sizes of cam sprags from two sizes of steel cam-section wire at the rate of 1000 parts an hour.

The special 10-ton, 42-in. stroke utility press being used for the job was built by Colonial Broach & Machine Co., Detroit.

Operation—Identical steps are broached at each end of the cam sprags simultaneously; then the completed piece is cut off. (See photo inset for typical part.) Four rods are fed at a time and one pass of the broach completes four pieces.

Stock 12 ft long is fed into the machine. As the stock advances, it automatically ejects the completed parts. Part length varies from ½ to 1⅜-in. and is held within 0.005-in. tolerance. Angular relationship to the cam section is held within ±½ degree.

Size Changes — Changing to either of the two cross-section sizes of the cam wire requires changing the guide plates in the fixture; changes in the steps require that the correct inserts be mounted in the broach bar. Adjusting a setscrew changes the length of a part.

Automatic feeding and clamping of the stock are hydraulically actuated and interlocked to the automatic cycle. When any one of the four lengths of cam section wire is used up, the broach returns to the top of the stroke and the machine stops.

Ceramics Challenge Machines

Surface speeds at which much-discussed ceramic tools will cut will make new demands on machine tool builders. Look for more horsepower, superspeed spindles

"FEW PRESENT-DAY machines are capable of realizing the fullest benefits of oxide tools; none has stretched the uses of the material to its limits."

That is the challenge issued by ceramic cutting tools, says Louis M. DeMarco, sales engineer, Stupakoff Division, Carborundum Co., Latrobe, Pa.

Seesaw—It means another chapter is about to be added to the story of tools and machines. In earlier chapters, high-speed steel, cast alloys and carbides made their entry, each demanding, and getting, higher speeds.

Now, the conversation of men in the ceramic tool business brackets the speed range between 500 and 3000 sfpm. To get 2000 sfpm on a part 2 in. in diameter, they say you'll have to use a machine that'll kick it around at roughly 3800 rpm.

Enthusiasts—This makes good news for machine tool builders. It'll make them strong supporters of ceramics. Ceramics will carve a niche which seems destined to come out of the high side of the carbide province. They will augment carbides (no one claims they're a replacement) and will obsolete the senior material on some jobs.

The word "obsolescence" tickles a machine tool builder. No peacetime activity will put as many new orders in the works as a new development that makes current equipment obviously out of date.

L. M. Cole, general sales manager, Warner & Swasey Co., Cleveland, believes that ceramic tools may "lead us to double spindle speeds in the next five to ten years. In some cases we'll have to go to bearing manufacturers to investigate bearing potential at these speeds."

Holding Ceramics

Speaking at the recent meeting of the Association of Iron & Steel Engineers in Baltimore, Mr. DeMarco also revealed that his company is conducting research on new techniques of holding ceramic tips to tool shanks. Metallizing, for brazing, and Epoxy resin cements are being checked. To date, ceramics have been clamped to the shank.

Production To Go Up

Look for a faster rate of shipments from machine tool plants. The National Machine Tool Builders' Association reports that shipments for the first quarter of 1956, at $193 million, were ahead of those for the same period last year by nearly $35 million.

The industry as a whole is still producing "substantially" below capacity, will add to output to keep deliveries reasonable. Builders are working against a comfortable eight-month backlog.

Need for Automation

"Only by accelerating the factor of productivity can we possibly keep pace with indicated future long-term demand," says Louis Polk, president of the National Machine Tool Builders' Association and president, Sheffield Corp., Dayton.

Mr. Polk told about the "Race of Productivity" at the Westinghouse Machine Tool Electrification Forum. He indicated that to reach projected production requirements, the available labor force in 1980 will be inadequate unless it's supported by accelerated mechanization.

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

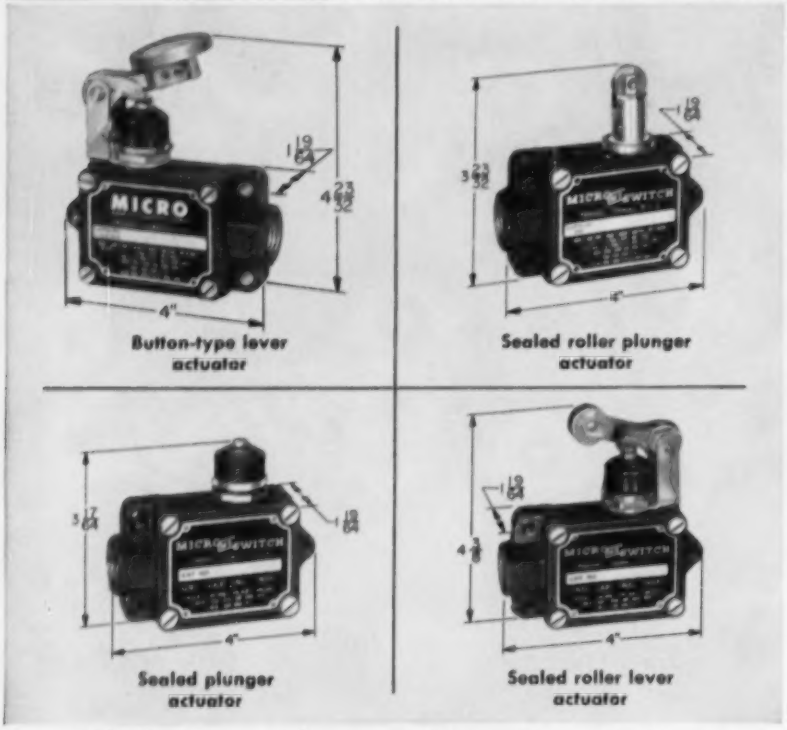
A subsidiary of The Colorado Fuel and Iron Corporation

Empire State Building, world's tallest building.

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

MICRO *precision switches*

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



High-Capacity enclosed switches for plant applications with heavy electrical loads

Many plant applications call for installation of switches which have more than average electrical capacity. MICRO SWITCH high-capacity enclosed switches meet this requirement with the capacity to make and break steady state currents of 20 amperes, 125, 250, or 460 volts a-c. They will handle inrush currents as high as 75 amperes — switch 10 amperes 125 volts when controlling tungsten filament lamp loads on a-c circuits.

All the types shown are available for either right- or left-hand mounting. They are widely used on present plant equipment as safeties, limits, and interlocks.

Button-type lever actuator: This actuator can be adjusted horizontally through 360° and vertically through 225°. The actuator is sealed with an elastomer (neoprene) boot. The switch is for manual operation.

Sealed plunger actuator: An elastomer boot covers the operating plunger and a ring gasket seals the cover. Die-cast aluminum enclosure protects the basic switch from vibration and shock.

Sealed roller plunger actuator: For cam or slide operation in applications where the approach of the actuating device is not parallel to the switch. Roller plunger assembly adjustable through 360°. Seals prevent entrance of dust, dirt, or moisture.

Sealed roller lever actuator: Well adapted to operation by any type of operation—straight line or cam. Roller lever can be locked in any position at intervals of .2 degrees within a range of 225°. Entire roller bracket can be rotated horizontally through 360° and tightened down in any position.

These switches are typical of a wide variety of MICRO precision switches which have proved successful in making existing machinery safer, more automatic, and more productive.

Basic Switch is Replaceable

The basic switch can be easily replaced, if necessary, without removing the enclosure from its mounting. Ample wiring space within the enclosure and the side facing terminals of the basic switch simplify wiring.

Underwriters' Laboratories Listing

1 H.P. 115 volts a-c

2 H.P. 230 volts a-c

20 amperes 125, 250, or 460 volts a-c

½ ampere 125 volts d-c

¼ ampere 250 volts d-c

Send for Catalog 101 "Switches for Industry"

MICRO precision switches are carried in stock by distributors in every key city. Look under "Switches, Electric" in the Yellow Pages.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

Seals the Pores

CASTINGS are sometimes porous and permit high pressure gases or fluids to escape. Impregnating them seals the pores and permits the use of otherwise imperfect castings.

Aluminum alloy castings, used in the fuel system of the KB-50 airplane refueling tanker, are impregnated with Metaseal, developed by the American Metaseal Mfg. Corp., West New York, N. J. Based on a polyester resin which cures or solidifies under heat, the impregnant corrects leakage and internal corrosion caused by microscopic porosity. Six thousand castings have been processed by the manufacturer, Hayes Aircraft Corp., Birmingham; no failures have been reported.

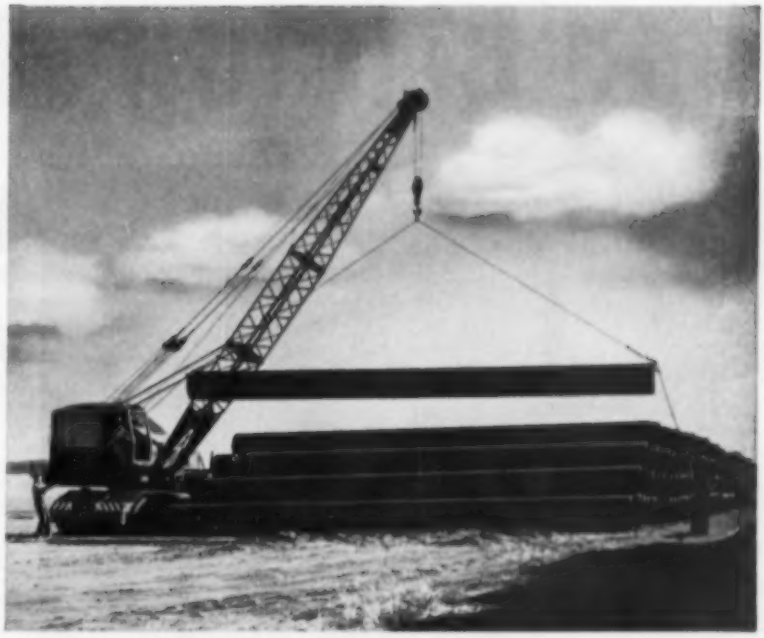
Application—The process is applied after all machining has been completed. The impregnant has excellent wetting properties which insure good penetration.

IMPREGNATION
. . . seals and saves porous castings

Hayes uses the batch immersion system. Castings are placed in an autoclave which is evacuated to remove all air from the pores. The impregnant is introduced while the castings still are under vacuum. Pressure then is applied for about 30 minutes, after which the castings are rinsed and cured.

Pressure Tested—The Air Corps requires a casting to be pressure tested with 250 psi of air while it is immersed in water.

Engineers point out that it is cheaper to save porous castings with the impregnating system. In fact, they recommend that all ordinary castings be impregnated rather than tested; impregnation is cheaper than testing.



How TRANSIT CRANE features can cut your handling costs

Material handling is more economical with Transit Cranes because these mobile machines have *more* of the features you need *most* to bring savings all down the line. Here are a few of these features and what they can mean to you on material handling jobs.

POWER CONTROLLED LOWERING for main hoist line on lifting crane permits delicate positioning of loads.

FRICTION SWING BRAKE, in addition to regular swing lock, permits more accurate spotting and holding of boom point over desired position.

INDEPENDENT BOOM HOIST WITH POWER CONTROLLED LOWERING provides extreme accuracy in load handling by enabling operator to boom up or down at any phase of the cycle.

SAFETY BOOM STOPS on lifting cranes are designed to prevent boom from accidentally snapping over center and striking cab.

PENDANT-TYPE BOOM SUSPENSION with 8 parts of operating line between bridle and boom point is ideal for changing boom lengths conveniently.

Transit Cranes are available in two sizes — the 15-ton 15-B and 25-ton 22-B. Ask your nearby Bucyrus-Erie distributor for full information on the size machine that will best serve your needs.

247E56

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

REPUBLIC CHATEAUGAY

Increases tap and electrical fittings

Electrical fittings cast from Chateaugay Pig Iron are accurately machined for perfect threads and alignment. The use of Chateaugay increased tap and die tool life 35%.

This Gedney Conduit Body, cast from Chateaugay, features toughness, resistance to impact, excellent ductility, easy and uniform machinability. Body finish is smooth and free of gatemarks, burrs and sharp edges.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

PIG IRON...

die tool life 35% for manufacturer.

Here's an outstanding example of how Chateaugay, Republic's exclusive premium Pig Iron, helps a manufacturer maintain a profitable position in a highly competitive market where price margins are extremely thin.

The Andrew Terry Company, Terryville, Conn., manufacturer of Gedney Electrical Fittings, was faced with the problem of producing high-quality, malleable cast iron fittings at the lowest possible price. Most of the fittings are machined, either tapped or die-threaded, to permit electricians to make fast on-the-job assembly with conduit, such as Republic Rigid Conduit.

In an attempt to keep costs down, ordinary pig iron was used in the cupola mix. This often resulted in porosity due to excessive shrinkage and open grain structure. Further difficulty was encountered during threading of the fittings. Hard spots in the castings cut the tool life of taps and dies to about 65% of expectancy.

Then, The Terry Company switched to Chateaugay Pig Iron with these distinct advantages as the result: (1) Tough, sound castings accurate to patterns and shapes having relatively thin wall sections. (2) A fine, uniform grain structure that provides better machinability. So much better that tool life has been increased 35%. (3) High tensile strength with resistance to heavy impact. (4) Excellent ductility.

These and other advantages of Chateaugay, the low-phosphorus, copper-free Pig Iron, can be applied to your production. A Republic Pig Iron Metallurgist will give you the complete facts. His service is confidential and without obligation. Just send the coupon.

STEEL

and Steel Products

INCREASE LIFTING EFFICIENCY in your foundry operation with Republic Chain Slings. Available in Alloy Steel, High Test Steel and Wrought Iron, each chain sling is designed, tested and warranted for the highest degree of safety. Because each type has a specific use, we recommend talking over your requirements with a Republic Chain Engineer. Or send coupon for literature.

INCREASE HANDLING EFFICIENCY with Republic Materials Handling Equipment. Here, PB-120-T Box and Skid Units, equipped for tiering, provide ready accessibility to finished castings . . . permit visible identification and accurate inventories. Republic Materials Handling Specialists will help you design units for your specific needs. Write for Catalog on the complete line.

INCREASE STORING EFFICIENCY of patterns and dies with Republic Wedge-Lock Steel Shelving. Specifically designed for high stacking of enormous weights, joints actually get tighter as weight increases. There's no distortion or instability. Wedge-Lock is completely flexible to meet changing space requirements. Send coupon for literature.

REPUBLIC STEEL CORPORATION
Dept. C-1734
3120 East 45th Street
Cleveland 27, Ohio

☐ Have a Pig Iron Metallurgist call.
Send more information on:
☐ Chain Slings ☐ Materials Handling Equipment
☐ Wedge-Lock Steel Shelving

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

to serve you

A call to any one of our seven warehouses will get you speedy service on your order . . . whether it's for *alloy steel bars, billets or forgings,* in any size, shape or treatment you need.

All seven warehouses are located in principal industrial areas. Each is modern and well-stocked, and staffed by expert metallurgists.

Call now if you need our own HY-TEN steels – "the standard steels of tomorrow", or standard AISI or SAE grades.

Or write for *free* copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson-Newbould, Ltd., Montreal and Toronto

WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39, Massachusetts

Faster Tool

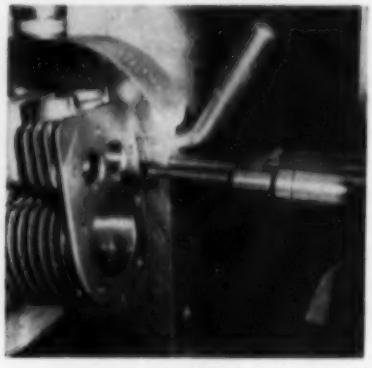
Carbide blanks in this chamfering operation slash machining and setup time

CHAMFERING cast alloy valve seats is faster by 70 per cent with Kennametal solid, square blanks. D. W. Onan & Sons Inc., Minneapolis, claims the finish is good enough not to require a final grind.

Operation — The application is the finish chamfering of two, 15/16 ID, valve seat inserts for single cylinder, portable gasoline engines.

On the first run, 450 valve seats were completed with each tool prior to any position change of the cutter. Pressure testing didn't turn up a single failure.

Tools—Two chamfering bars are used with pilots which enter the full length of the valve guides before the cut is started. Depth adjustment is provided by an adjustable nut at the shank end of each bar. The company designed a head for driving the bars.



CHAMFERS
. . . up to 70 per cent faster

Solid blanks, 3/16-in. square and 1¼-in. long, are slipped into sleeves sweated into the chamfering bars, providing a 5-degree negative rake and cutting relief angle. An Ex-Cell-O machine operates at a feed of 0.002-in. per revolution and 200 sfpm. Total depth cut is 1/32-in.

When the cutting edge becomes dull, the bar is advanced slightly in the holder. Up to 30 new cutting edges are available before regrinding is required. Resharpening isn't needed until the whole length of the blank is used.

Even truer today

We ran this **B&W Insulating Firebrick** advertisement in 1947

24 years now

Photo courtesy Sun Shipbuilding & Dry Dock Company

Only in main arch approximately 2 feet from each end of the furnace

The furnace that PAID FOR ITSELF MANY TIMES OVER

Still lined with its original B&W Insulating Firebrick after 15 years of normalizing and stress-relieving service, this furnace is giving exceptional performance. Despite the added strain of the rigorous war years, the 30,000 B&W IFB used to line sides, ends and arch have required no appreciable maintenance!

It is no wonder the operators can report:
"This furnace has paid for itself many times over."

For furnace performance that assures highest production at lowest cost, even after years of grueling service, you can always count on lightweight B&W Insulating Firebrick. Your local B&W Refractories Engineer will be glad to help you select economical B&W Refractories for your furnaces.

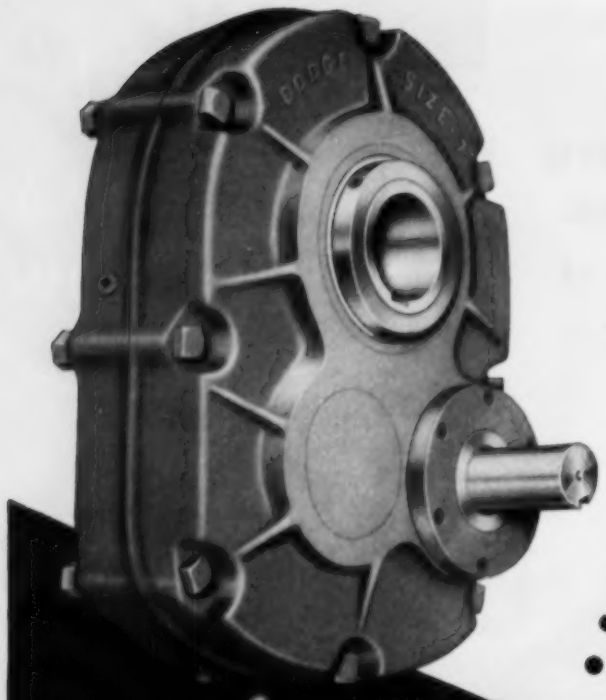
B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick •
B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars
B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R550



97% EFFICIENCY

- NO FOUNDATION
- NO FLEXIBLE COUPLING
- NO SLIDING BASE
- NO LINING UP PROBLEM

—that's Torque-Arm

THE DODGE SHAFT-MOUNTED SPEED REDUCER

Proved in tens of thousands of installations, in all types of industry, this new and better kind of speed reducer delivers up to 97% efficiency . . . makes savings up to one-third!

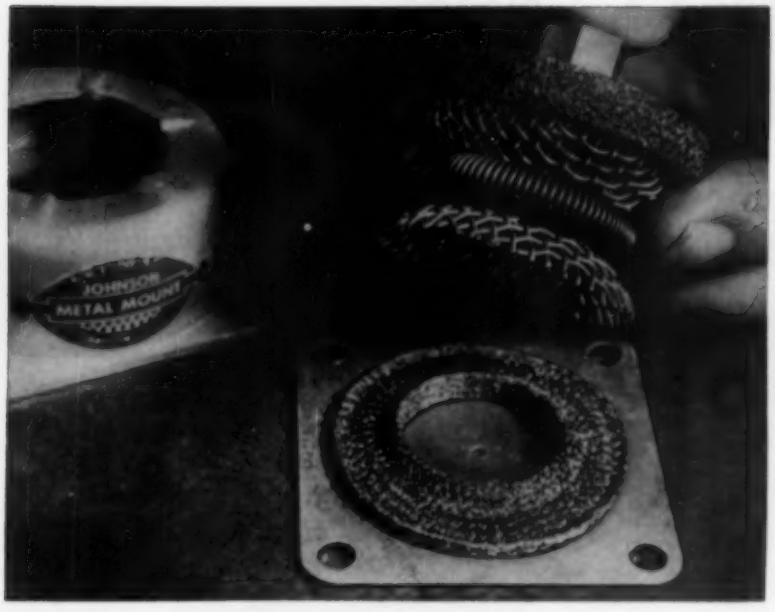
Mounted directly on the driven shaft, the reducer is anchored by the Torque-Arm, fastened to any fixed object. No need for foundation, flexible coupling or sliding base. No lining up difficulties. Unit is driven through any V-belt drive. Stock Taper-Lock Sheaves prescribed for each job. Tri-Matic Overload Release and Backstop available if desired.

Dodge Torque-Arm is America's most complete line of shaft-mounted speed reducers — single and double reduction series—capacities from 1 hp to 60 hp; output speeds of 12 to 365 rpm. Sold from Distributors' stocks.

DODGE MANUFACTURING CORPORATION
4400 Union Street, Mishawaka, Indiana

Call the Transmissioneer, your local Dodge Distributor. He can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.



Wire cloth fills a difficult role in which . . .

Beryllium Copper Damps Vibration

SHAKE and quiver play hob with electronic equipment instruments. Put them in a vibrating environment, such as an airplane. Without some form of isolation mounting, they soon shake apart.

A modern bomber may have as many as 3000 devices with the function of arresting vibration and resonance from engines, propellers, turbines and the air. Their size and appearance belie their importance.

One small isolation mounting made by the K. W. Johnson Co. Inc., Dayton, O., seems to be nothing more than a metal cover enclosing a couple of hemispheres of wire cloth held together with a brass eyelet and surrounded by a loop of coil spring.

Wire Cups—The hemispherical springs are made of Berylco beryllium-copper wire cloth purchased in strip rolls 2⅛-in. x 100 ft. They are formed and cut in one operation on a punch press, then heat treated.

Two of these cups are fastened together back to back with a brass eyelet, and a coil spring of stainless steel is stretched around the waist of the assembly.

Rough Life—The mounting has to protect equipment in shock landings up to 30 g under minor crash conditions. It must pass test conditions under temperature differentials ranging from −85°F up to 390°F.

As a shock is encountered, the motion of the beryllium-copper spring is resisted by the friction of the coil. The result is a double damping system in which the coil spring tempers the screen spring system and, at the same time, is damped by it.

Beryllium Copper — Stainless steel was tried in both spring units. It was assumed that fatigue life and corrosion resistance of heat treated wrought stainless would be the same in the cloth form. But in the 50-hour salt test—required by the government—the stainless steel cloth could be broken apart and disintegrated by handling. The stainless steel coil spring was not affected because it is of cold drawn material.

A shift was made to beryllium-copper alloy to obtain a cloth which matched the spring characteristics of stainless, with greater fatigue life. It holds up without setting tendencies and is unaffected by salt atmosphere.

DODGE
PRODUCTS
you should know

AIR-GRIP CLUTCHES

CHAIN COUPLINGS

SEALED-LIFE V-BELTS

DODGE BULLETINS
YOU SHOULD HAVE

- ☑ Air-Grip Clutches. Technical data, sizes and selection tables. Bulletin A634
- ☑ Chain Couplings, Taper-Lock Sprockets and Dodge Roller Chains. Technical data and selection methods. Bulletin A644
- ☑ Sealed-Life V-Belts. Construction details and complete data on sizes, pitch lengths and outside lengths. Bulletin A686

Write for your copies.

DODGE MANUFACTURING CORPORATION
4400 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

At Scully-Jones and Co., Chicago:

MACHINING COSTS GREATLY REDUCED

Here's how the Carboloy Machinability Computer showed Scully-Jones and Co., Chicago, how to reduce machining time 46% on a single job. Original operating standard for machining expanding shells called for 244 minutes per part. But by calculating the optimum combination of speeds, feeds, and other data on the Computer, the company saved 48.8 minutes per part. The Computer was used to determine setups for both HSS and carbide tools . . . on turning, facing, drilling, and boring operations.

Partial list of plants now using the Carboloy Machinability Computer:

Allied Products Corp.
Armstrong Cork Company
Beech Aircraft Corp.
Bendix Aviation Corporation
  Utica Division
Bethlehem Steel Company, Inc.
Boeing Airplane Company
Bryant Chucking Grinder Co.
Burroughs Corporation
Caterpillar Tractor Company
Chrysler Corp.
  Airtemp Division
The Cincinnati Shaper Co.
Cone Automatic Machine Co., Inc.
DeLaval Steam Turbine Co.
The DoALL Co.
Fuller Company
General Electric Company
Gisholt Machine Company
Goulds Pumps Inc.
Greenfield Tap and Die Corporation
  Geometric Tool Company Division
Greenlee Bros. & Co.
Houdaille Industries, Inc.
  Buffalo Hydraulics Division
Joy Manufacturing Company
  Claremont Division
Ladish Co.
The Maytag Company
Mergenthaler Linotype Company
Miehle Printing Press & Mfg. Co.
Mueller Brass Co.
The National Acme Company
The New Britain Machine Co.
  New Britain-Gridley Machine Division
Pachmayr Corp.
Porter-Cable Machine Company
Reed Roller Bit Co.
  Cleco Air Tools Division
The R. K. LeBlond Machine Tool Co.
Rockwell Spring & Axle Co.
  Blood Brothers Machine Division
Ryan Aeronautical Company
S. Morgan Smith Co.
Standard Pressed Steel Co.
Sundstrand Aviation
  A Division of Sundstrand Machine Tool Co.
Thompson Products, Inc.
Wagner Electric Corporation
Westfield Metal Products Co., Inc.
The Yale & Towne Manufacturing Co.
  Yale Materials Handling Division

WITH CARBOLOY MACHINABILITY COMPUTER

- **Determined most efficient cutting conditions**
- **Set up new operating standards in seconds**
- **Eliminated wasteful tryout runs, saved stock**
- **Saved 17 hours' machining time on a single job**
- **Provided closer control over machine downtime**

Obtaining maximum production from their machines is now an easier matter for Scully-Jones and Co., Chicago. Machining data are fed into their Carboloy® Machinability Computer . . . and in seconds, optimum speeds, feeds, horsepower ratings, or any of 16 other operating variables are figured for the operator.

On the job at left, for example, the Computer showed how to cut machining time 46% on a 13-piece run . . . saving 17 machining hours, and eliminating wasteful, time-consuming tryout runs.

Benefits extend plant-wide

On other jobs throughout the plant, the Computer established new operating standards, corrected and verified existing ones. When necessary to improve tool life or production rate, the Computer determined new operating conditions in a fraction of the time previously required.

The advantages of the Carboloy Machinability Computer extend far beyond figuring job setups. The Computer simplified inventory problems by predicting the rate of tool wear. It aided grinding rooms in planning work loads, and helped the plant superintendent coordinate production schedules.

The Carboloy Machinability Computer can be used by anyone with machining experience, after a short familiarization period. And, it can be a powerful educational tool by teaching operators how to improve production or reduce downtime through proper variations in operating conditions.

Ask for demonstration

The Machinability Computer is battery-operated, portable, and rugged. It is priced at $495 (f.o.b. factory, Detroit).

For more information on how the Computer can help your plant increase production and reduce manpower costs, mail the coupon below. If you wish, we will gladly arrange a demonstration in your plant.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11141 E. 8 Mile Blvd., Detroit 32, Michigan

☐ Please send more information on the Carboloy Machinability Computer.

☐ Have a representative make an appointment to demonstrate the Computer.

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

Abrasive Cutting | *the best way to cut many materials the only way to cut some*

Allison Cut-Off Wheels

Wide variety of shapes and materials cut with abrasive wheels

•Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch diameter cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous: aluminum alloy, magnesium and many others.

Whatever the problem there is an Allison Wheel to meet it . . .

Profitable abrasive cutting means using the right abrasive wheel . . . and the proper abrasive cut-off machine . . . for the specific job. If the required result is a smooth, fine finish, without hardening or metallurgical changes, a WET cut is called for. Rubber bonded ALLISON Wheels give long wheel life and high quality cuts for such an operation. If the cut is a big one (over 2" solid) an OSCILLATING Cut-Off machine . . . with the proper ALLISON Wheel . . . will do the job fast and economically. Where quality requirements are less exacting, dry cutting with ALLISON resinoid bonded wheels is often the best method.

Allison
ABRASIVE CUTTING WHEELS

Consult a specialist for best results

•ALLISON specializes in the manufacture of abrasive cut-off wheels. Be sure that you are getting the most from your cutting methods. Abrasive wheel cutting is faster than sawing—in some cases it is 10 to 20 times as fast. The savings in cost can be tremendous. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

ACCO

Send for Booklet "ABRASIVE CUTTING" Today

ALLISON DIVISION
AMERICAN CHAIN & CABLE

2648 Island Brook Avenue, Bridgeport 8, Conn.

Hi-Temp Rope

A new fiber takes its place in industry. It comes in paper, bulk and block form

NONFLAMMABLE rope is the latest rope trick from the Carborundum Co., Niagara Falls, N. Y. Made of Fiberfrax, an aluminum-silicate ceramic fiber, it will resist temperatures up to 2300°F.

Light — The new material is light, resilient and offers handling and installation advantages at high temperatures.

Thirty ft of this rope, ½-in. in diameter, weighs 1 lb and gives 50 per cent more rope length than an equivalent weight of asbestos rope. The long staple adds to the resilient feature and makes it useful as expansion joint packing and high temperature calking. It may be used as insulator wrapping and for various high temperature gaskets and seals.

Chemistry—Fiberfrax is made in paper, bulk and block forms. It is chemically inert, and most furnace atmospheres, including hydrogen, do not affect it.

The rope is made in the three-strand form, 15 per cent of which consists of carrier fibers. The maker expects to produce diameters ranging from ¼ to ¾-in. Coils contain up to 800 ft.

This rope resists a blowtorch even under stress. It's good for expansion joints and furnace calking

Simple Arithmetic...
Type 302, Sheet Base Price 44.50 cents per lb.
Type 430, Sheet Base Price -34.50 cents per lb.
Saving 10.00 cents per lb.
in Stainless SHEET Costs!

Now You Can SAVE $200 Per Ton!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10 cents per pound difference in base price. Some of our customers are already saving more than $200 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

5-O WOODLAND AVENUE, WASHINGTON, PA.

The rougher the service,

the greater the need for

PEARLITIC MALLEABLE CASTINGS

Cast pearlitic malleable steering gear housing—by NATIONAL

AA-2911 A

In mines and quarries . . . on the big construction jobs—that's where trucks take the worst beating. And that's also why many off-highway truck manufacturers have turned to pearlitic malleable castings—by National—for heavy duty parts. For truck builders know that pearlitic malleable has high ultimate strength . . . resists wear and fatigue under heavy loads and impacts.

And there are lots of other "plus" advantages in pearlitic malleable castings—from National. For example, they possess excellent non-seizing properties . . . can be either liquid or air-quenched . . . can be given a smooth finish. Perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel=100).

Pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of *your* product.

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The nation's largest independent producer of malleable and pearlitic malleable

Pipe Inserts

It's a good way to improve corrosion resistance and reduce welding costs at the same time

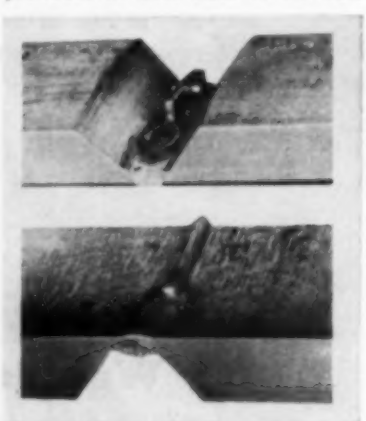
WELDING a pipe is faster with a consumable insert ring. A solid type, made by the Industrial Piping Division, Grinnell Co., Providence, R. I., makes root passes uniform, smooth and free of center line cracks.

Root passes made with the rings and an inert-gas, tungsten arc make an effective back-up piece for subsequent shielded-metal arc welding with covered electrodes.

The consumable insert reduces the number of passes by one or two, a big help in cutting welding costs. On many sizes of stainless steel pipe, the insert eliminates the need for separately supplied filler metal. Fewer root passes improve the resistance to intergranular corrosion in the heat zone.

Sizes—Insert rings are made of mild steel, alloy steel (1.25 Cr, 0.5 Mo; 2.25 Cr, 1 Mo; 5 Cr, 0.5 Mo), stainless steel types 304, 304 ELC, 310, 316, 316 ELC, 347 (fully austenitic) and 347 (4-to-6-per-cent ferrite).

At the top, operator is positioning the solid consumable insert. Inserts below show the ring partially welded to demonstrate appearance. Ring protrudes on both sides of the weld



NEW!

Revolutionary AIRengineering Development by Ingersoll-Rand . . .

TORSION BAR
Torque control
IMPACTOOL

FOR HEAVY NUT RUNNING

MULTIPLE TORQUE SETTINGS
MAXIMUM TORQUE—550 FT. LBS.
SIZE 5340T

. . . how can YOU use these OUTSTANDING ADVANTAGES?

Torque can be quickly and easily set, using the jig as shown above. The torsion bar automatically shuts off the tool when the nut running resistance becomes equal to the stress preset in the torsion bar.

- **POSITIVE TORQUE CONTROL**—a revolutionary use of a rugged steel torsion bar for precision control of torque—combined with the power and speed of the Impactool.
- **SIMPLE TORQUE SETTING**—torsion bar adjusting sleeve is clearly calibrated for changing torque with easy-to-use torque jig.
- **TORQUE SETTING REMAINS CONSTANT**—for any nut running condition until the adjustment is changed.
- **ELIMINATES SPECIAL TEST FACILITIES**
- **NO NEED FOR PRESSURE REGULATORS**—Impactool operates at full power and speed.
- **NO OPERATOR TRAINING**—Torsion Bar *Torque Control* does not rely on operator's sense of timing.

• Write, phone or wire for a free demonstration . . . or write direct for full information on this revolutionary AIRengineering development.

8-306

Ingersoll-Rand

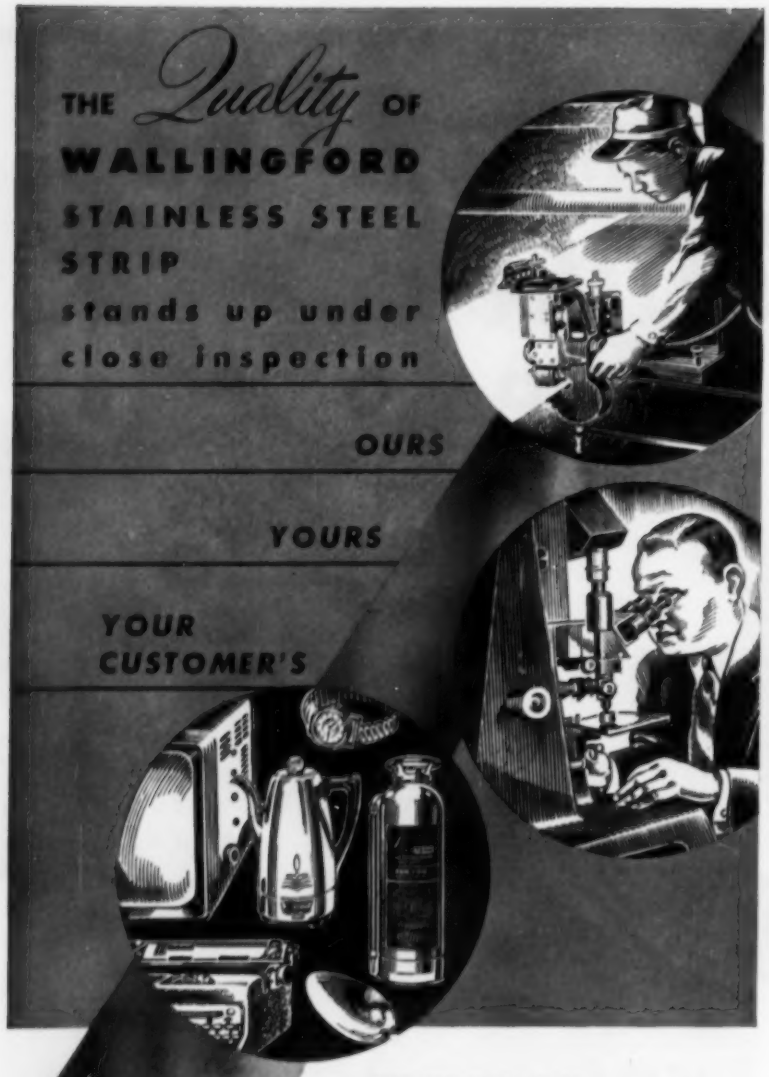
Air Tool Division
11 Broadway, New York 4, N.Y.

THE *Quality* OF
WALLINGFORD
STAINLESS STEEL
STRIP
stands up under
close inspection

OURS

YOURS

YOUR
CUSTOMER'S



• THINNESSES TO .002".
• ACCURACY TO ± .0001".

Even in this age of automation, quality is no "push-button" accomplishment. Modern machinery still must be teamed with skilled, experienced craftsmen to achieve the ultimate in quality. That's how it is at WALLINGFORD, and that's why WALLINGFORD Stainless Steel Strip stands up under the scrutiny of our advanced design electronic quality control devices . . . will meet your most rigid requirements for tolerance, analysis, temper, uniformity . . . and will pass the final test of customer usage and approval. You're invited to visit WALLINGFORD soon to see for yourself the excellence of our facilities and personnel . . . and the quality of our product.

THE
WALLINGFORD
SINCE 1922
STEEL CO
WALLINGFORD, CONN., U.S.A.

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP • STAINLESS WELDED TUBES AND PIPE

Measures Tension

IT'S hard to tell the tension of a moving wire. Now a Chicago electrical manufacturer has an ingenious method that's easy to duplicate: A dial tension indicator and three pulleys attached to a fixture used with coil winding equipment.

Banding Wire—The coils used in the armatures of crane motors must be held in perfect alignment by banding wires. Imperfect banding causes breakage and internal efficiency losses.

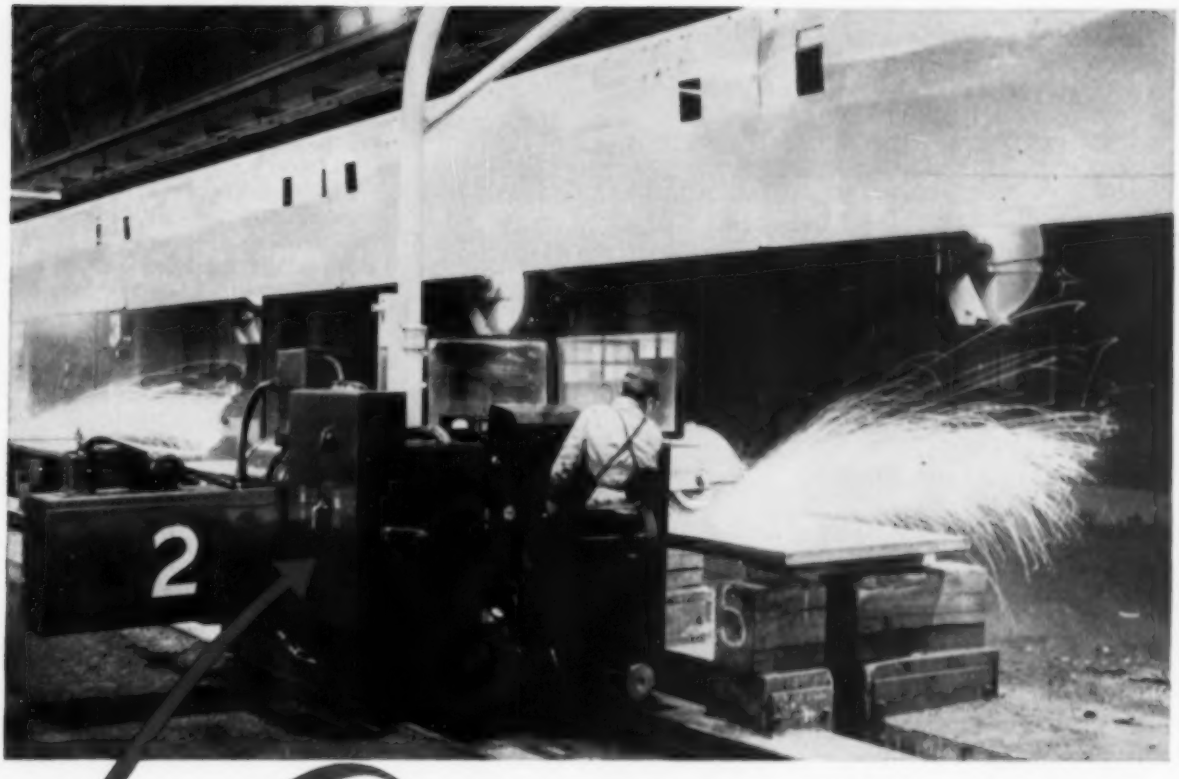
The proper wire tension depends on the armature. Measurement is made with a Dillon, traction-type dynamometer and a shunt arm.

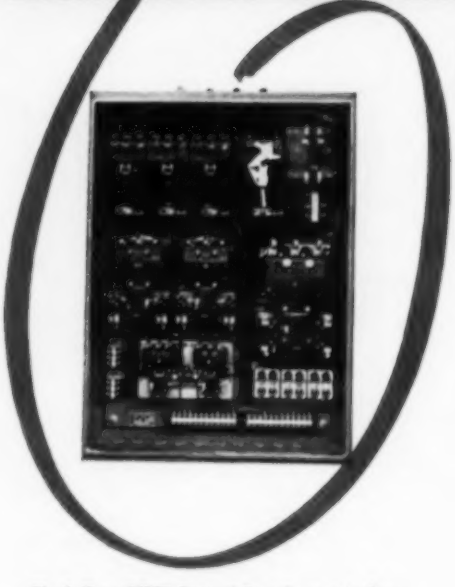
THE TENSION
. . . of a moving wire

The moving wire passes over a lower and an upper pulley which are mounted to the tensioning arm. Midway, the wire passes over a center pulley which is connected to the indicating dynamometer. The outer pulleys are guides for the wire. On a decreasing load, tension against the center pulley drops; increased tension brings it up again. By watching the dynamometer, an operator can produce uniform work, reduce rejections.

Variations—This application can be varied to meet space and wire size requirements. The dynamometer is available in 13 capacities from 0-500 to 0-100,000 lb. The meter is equipped with a red maximum pointer and a manual reset for use when load is applied.

The equipment is portable; 5 and 10-in. dials are optional.





Clark Type "CY" Control Panel mounted on each machine contains a size 0 reversing, two size 2 and one size 3 Type "CY" motor starters.

CLARK Type "CY" CONTROLS

help Mid-West Slab Grinders triple output at Crucible Steel!

Ten track mounted billet grinders built by the Allied Machine and Engineering Co., a subsidiary of Mid-West Abrasive Company, are setting new performance standards at Crucible Steel's Midland, Pa. mill. Replacing manually operated and unwieldy swing grinders, these machines do the job better, faster and safer with electrically-controlled hydraulic positioning.

Accurate and complete control of stroke, wheel position, rotation and pressure results in smaller metal loss, less wear on grinding wheels and better finish. Clark Controls provide the accuracy and dependability these machines require, and prove again that Clark Type "CY" starters have the extra stamina required for heavy-duty mill-type service.

The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

ONE OF THE GARLOCK 2,000

SHALLOW STUFFING BOXES NEED THIS KIND OF "GRIP"

GARLOCK
431 CHEVRON* PACKING

tightens as pressure increases, eases off as pressure decreases, assuring no-leak sealing and minimum friction on rams, plungers, reciprocating rods, etc.

LOOK AT THESE SERVICE REPORTS:

- On hydraulic press with 40" dia. ram, operating at 6000 psi pressure, .006" clearance between ram and gland, GARLOCK 431 CHEVRON size 40" x 41½" by only 2" deep gave 14 years service.
- On hydraulically operated clutches with ¾" cylinder, 500 psi pressure, ¾" travel, operating intermittently. Neither leather cups nor "O" rings worked well. Now packed with GARLOCK 431 CHEVRON ⅜" x ¾" x 17/32" deep. Result: smooth, positive sealing.

And remember, 431 CHEVRON Packing is only one of "the famous GARLOCK 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet *all* your needs. It's the *only* complete line . . . it's one reason you get unbiased recommendations from your GARLOCK representative. Call him today or write for Folder AD-115.

*Registered Trademark

THE GARLOCK PACKING COMPANY,
Palmyra, New York

For Prompt Service, *contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.*

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints

Keep Rust Away

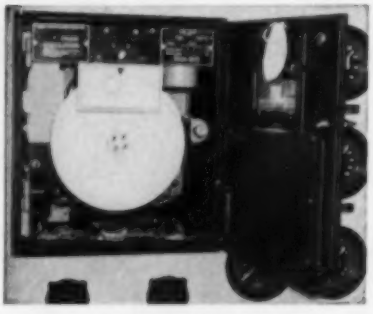
Rust inhibitor now packaged in shaker bags and spray bottles for small-quantity users

WHEN machinery, parts or small tools must be stored, you face the rust problem. A rust inhibitor, such as VPI crystals, is an effective solution. Available in 2-oz shaker bags or 4-oz plastic spray bottles, the inhibitor can be applied to any steel or aluminum surface.

Bags — When parts are to be stored, the bagged VPI is recommended. Slight shaking will cause some of the inhibitor to sift through the porous cotton bags or it can be sprinkled on.

Although a hermetic seal isn't necessary, a fairly tight enclosure is recommended to cut the loss of rust inhibitor. As long as any inhibitor remains in the bag, protection continues.

Spray—It may be easier to use the powder in some instances. Squeezing the plastic bottle causes a fine mist which will diffuse into hard-to-reach areas.



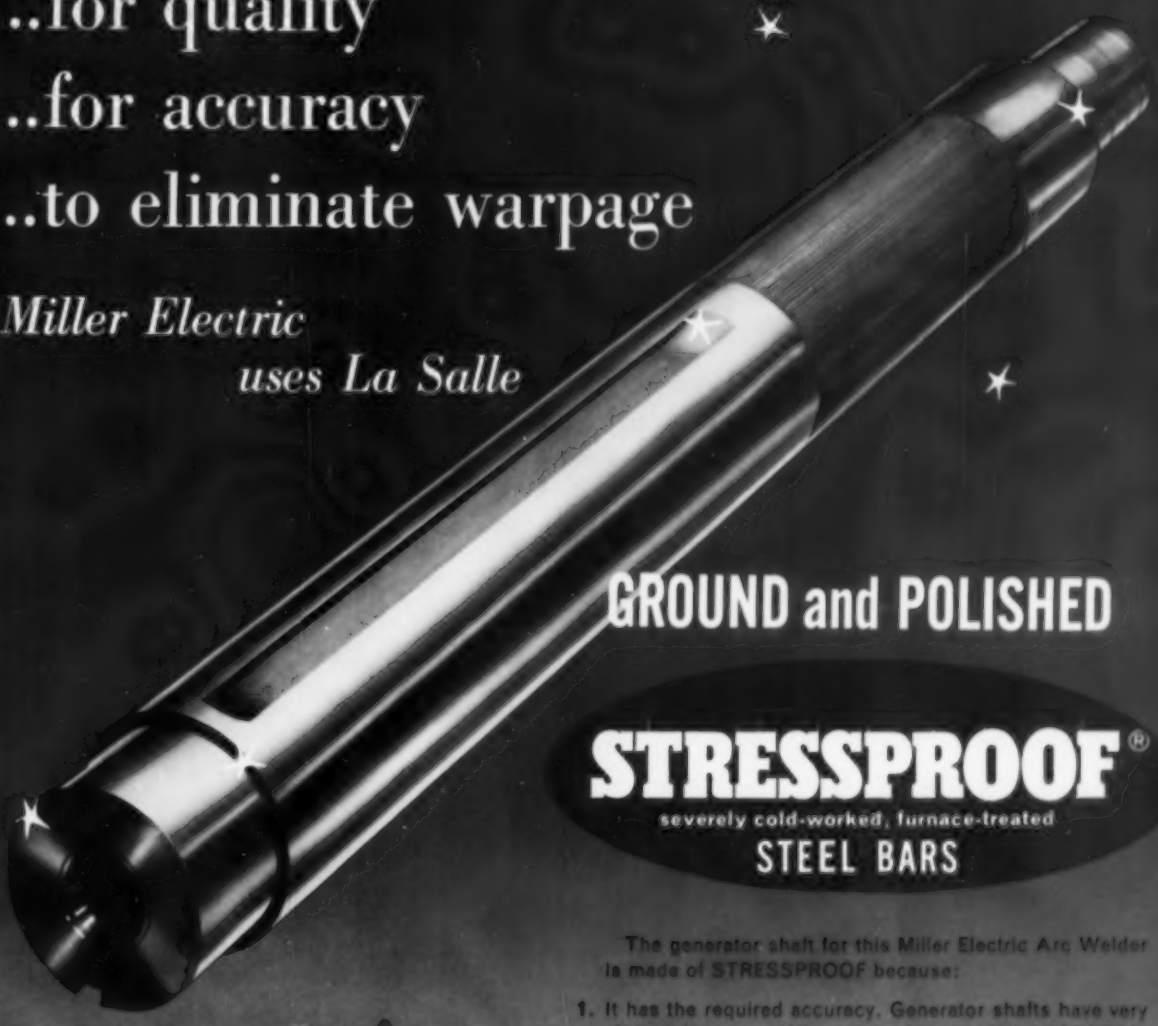
ELECTRICAL GEAR
. . . protected by bagged rust inhibitor

Cabinets containing small parts first are sprayed with the powder, then bags of VPI are suspended near the top of the cabinet for continuing protection. Similar methods are used with heavy equipment and office machinery which then are covered with a dust shroud. Under normal conditions, a 2-oz bag of the inhibitor will protect equipment in a 30-cu-ft enclosed space for two to three years.

VPI is a trademark of the Shell Oil Co. The bagged crystals (called V-B-i) and the bottle spray powder (called R-i-P) are packaged by Al-Con Chemical Co., New Orleans.

..for quality
..for accuracy
..to eliminate warpage

Miller Electric
uses La Salle



GROUND and POLISHED

STRESSPROOF®

severely cold-worked, furnace-treated

STEEL BARS

The generator shaft for this Miller Electric Arc Welder is made of STRESSPROOF because:

1. It has the required accuracy. Generator shafts have very close tolerances. When ground and polished STRESSPROOF is used, no expensive finishing operations are required. Simply machine the ends, cut the keyway, knurl and assemble.
2. STRESSPROOF machines faster and smoother than other high strength steels.
3. STRESSPROOF eliminates warpage which often occurs during machining of long keyways.
4. STRESSPROOF offers the increased strength without heat treating.
5. STRESSPROOF makes a better part at lower cost.

In addition to a beautiful finish and carefully controlled accuracy, ground and polished STRESSPROOF provides four important in-the-bar qualities: (1) High Strength, (2) Machinability, (3) Wearability, (4) Minimum Warpage. It is available in either cold-drawn or ground and polished finish.

The outstanding quality and accuracy of ground and polished STRESSPROOF made a better generator shaft for this arc welder manufactured by Miller Electric Manufacturing Co., Inc., Appleton, Wisconsin

Get your copy of this helpful data bulletin 15

LA SALLE STEEL CO.
1414 150th Street
Hammond, Indiana

Please send "Improve Quality—Cut Costs" booklet.

name _____

title _____

company _____

address _____

city _____ zone _____ state _____

La Salle STEEL CO.
1414 150th St., Hammond, Indiana

La Salle manufactures America's most complete line of quality cold-finished steel bars.

HERESITE

REG. U. S. PAT. OFFICE

Our New Plant in

GARWOOD, NEW JERSEY

WILL BE READY FOR PRODUCTION JUNE 1ST, 1956.

There is a great need to serve our customers in the Eastern industrial area, first to expedite shipments and second to have a department available where coating and rubber lining may be performed with efficiency, fast delivery, and a saving on transportation costs. This plant is now ready for operation and is equipped with the most modern baking ovens and other facilities necessary to accomplish coating applications of both types mentioned above. A railroad siding at the plant will enable us to line railroad tank cars.

In addition to the coating division, a large inventory of Heresite products will be kept in stock enabling us to make prompt delivery to our customers.

This plant will be under supervision of key personnel transferred from Manitowoc.

HERESITE & CHEMICAL COMPANY

Main Office & Plant, 822 So. 14th Street, Manitowoc, Wisconsin

Eastern Division, 546 South Avenue, Garwood, New Jersey

Chicago Office, 327 South LaSalle Street, Chicago, Illinois

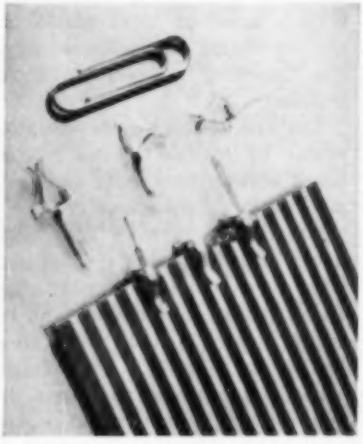
Fights Fatigue

BERYLLIUM copper is two to three times better than other contact materials when it comes to fatigue, says the Beryllium Corp., Reading, Pa. That is the primary reason it is used for contact materials in printed circuits.

Electronics — Connectors that must be inserted and removed hundreds of times soon wear out and fail to make proper electrical contact. Beryllium-copper lasts for 1000 or more insertions.

Connectors are the vital links between printed circuit cards. The average printed circuit connector is a long flat insulator with many two-pronged spring contacts that engage both sides of the circuit card. Copper laminations are printed on only one side of the card. The contact is U-shaped.

A plastic base houses one or more contacts. These are mated to the proper card and held either by friction or solder. The contacts are held in the plastic base by crimping, twisting or two-piece captivation.

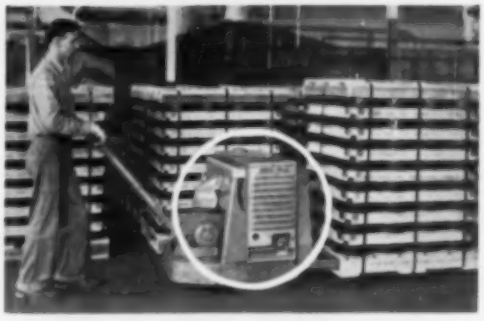


Beryllium-copper clip inserts and a printed circuit. Paper clip indicates how small it is

Maker—H. H. Buggie Inc., Toledo, O., last year used more than 6 million contacts and supplied them to makers of television sets, radios, radar equipment, guided missiles, computers, etc.

Standard Buggie connectors often are plated with gold or silver to lower electrical resistance. Other plating metals, like rhodium, are sometimes used for corrosion resistance.

Get the Advantages of READY-POWER on Your Electric Industrial Trucks



Get Live Power for Walkie Trucks

Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

Work Your Fork, Platform, Tractor Trucks 'Round the Clock

Ready-Power gas-electric and LPG-electric units give materials handling trucks continuous, full power all the time. Slowdowns due to power fatigue are eliminated. The simple, all-electric control and live response make Ready-Power-equipped trucks rate high with truck operators.

Energize Lift Magnets on Your Electric Trucks

In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.

Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

Your Truck is No Better than its Power . . . Write for Information on Ready-Power gas-electric, LPG-electric, and Diesel-electric Units

READY-POWER

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Climate for Progress

". . . If we are to meet tomorrow's challenge, we must be equipped with tomorrow's facilities," says Charles F. Kettering. That's the thinking behind General Motors' $100-million Technical Center dedicated this week

ASSIGNMENT: Develop a production process from a basic principle.

Result: Gyrofinishing. A new way of abrasive polishing trim parts for automobiles and appliances before electroplating.

The problem is typical of many handled by engineers in the Process Development Section, one of four staff groups at GM's new Technical Center outside Detroit.

The result is in line with what GM management expects from this section of its research facility. It was set up to translate research findings into processes that can produce in the millions . . . in the interest of better quality and reduced costs.

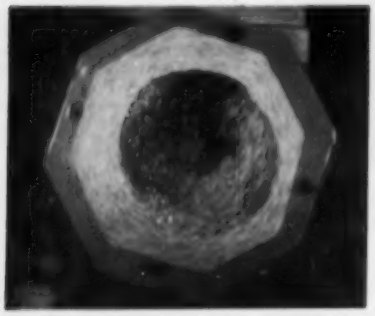
Pictures below show you how the finishing problem was solved.

Principle — In barrel finishing, the sliding action between parts and the abrasive does the work. It usually takes a lot of time to get a good finish.

At the start of the study, the axis end of a barrel was covered with a sheet of clear plastic, so the operating characteristics of the tumbling process could be watched.

The idea: Long cycle operation might be reduced if the relative speed between the parts and abrasive could be increased.

By looking through the plastic cover, engineers saw that centrifugal force from increased barrel speed caused the abrasive and the parts to pack against the wall of the drum (Fig. 1). The relative movement between the parts and the abrasive was curtailed because



1. Plastic cover showed that more speed wasn't the answer. Parts and abrasive packed against side of barrel

2. A shaft was mounted beside a drum to hold parts submerged in the revolving bed of abrasive

3. A larger machine was built. With harder abrasive, steel parts as well as zinc diecastings were finished

the whole load was carried around as a solid mass.

Next Idea — This suggested: Hold the parts in position and allow the revolving bed of abrasive to pass over their surfaces to increase relative movement.

A drum, about 2 ft in diameter, was built to rotate on a vertical axis. A shaft was mounted beside it so that one end would hold parts submerged in the revolving bed of abrasive. A crank handle on the shaft made it possible to orient the position of the part to the abrasive stream (Fig. 2).

The first test pieces were window regulator handles. They fit the over-all objectives. They were small, irregular in shape and were a high-volume production part.

Change—It soon was obvious that standard abrasive chips used for barrel finishing packed and were too harsh. This called for many tests before a satisfactory one was found. Composition of abrasive generally used now: Maize (ground corn cobs), 40 to 60 per cent by weight of the dry mixture; liquid buffing composition, 40 to 60 per cent; water, 20 to 30 per cent.

First tests with the new abrasive showed that a finishing job could be done on the diecast handles in seconds. Conventional barrel finishing takes hours. The new method was christened gyrofinishing because of the revolving action of the abrasive.

Check Patents—General Motors' patent section found that the principle was patented in the nineteenth century. The patent, for finishing openings in scissor handles, was no longer in force.

A search of the literature uncovered practically no information on free abrasive finishing. GM engineers settled down to a program to learn more about the characteristics and applications of their new tool.

Progress—A larger machine was built to handle a greater variety of parts. It was found that steel parts as well as zinc diecastings could be finished if more aggressive abrasives were used. Before long, tough jobs, such as bumper guards and grille parts, were being polished (Fig. 3).

Success with large parts led to the building of a bigger machine (Fig. 4). Parts were lowered into the abrasive by an air cylinder attached to the machine head. Called a single-station, vertical gyrofinisher, it's still used at the Tech Center for laboratory work on abrasives and to run sample parts for GM Divisions.

Production — The first gyrofinishing machine for production was a multiple station unit for polishing copper plate on steel bumper guards and grille bars. Process Development built it. It had a load-unload station, two polishing drums and a wash station.

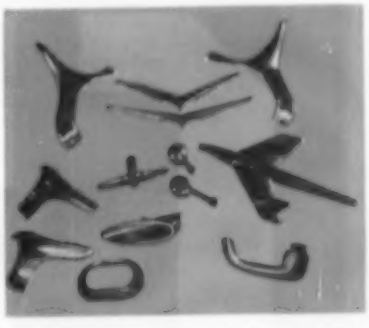
A second gyrofinishing machine was built to polish steel grille parts at GM of Canada. It was designed for lower production.

Multiple station machines were designed and built for four other divisions (Fig. 5).

Development work continued. A horizontal-barrel-type machine fed by a continuous conveyor was built (Fig. 6). It overcame disadvantages of the vertical-barrel types for certain applications.

Subcontract—Although the Tech Center's Process Development Section tackles many kinds of problems, it does not usually tie up personnel and facilities to build equipment that can be made on the outside.

For example, it designs a lot of



7. These parts have been polished in Gyrofinishing machines and are ready for electroplating

4. This experimental machine had an air cylinder to lower parts into a vertical drum containing the abrasive

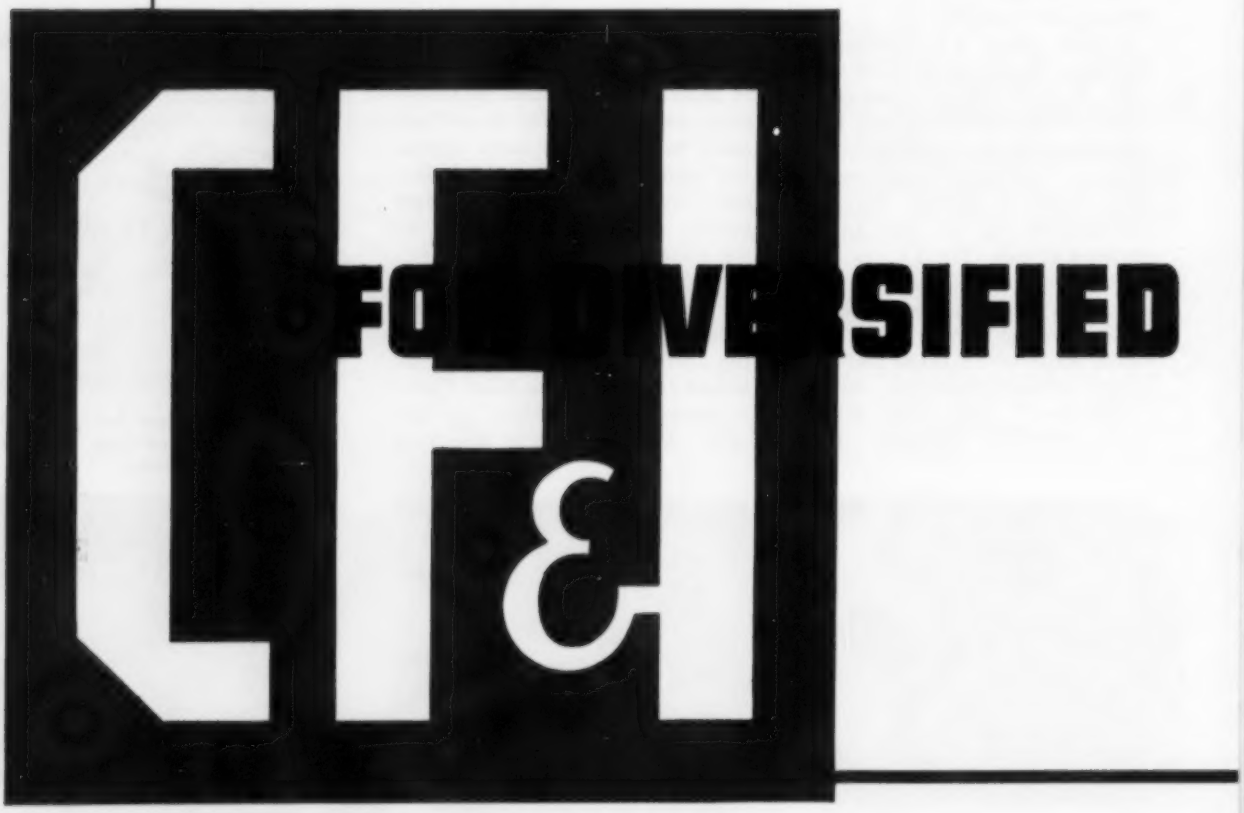
5. One of the first production models was a multistation machine for finishing interior door handles

6. This horizontal machine was developed to eliminate time lost in indexing spindles in vertical machine

CF&I is one of America's most diversified producers of steel products. For today's CF&I organization was formed from many steel companies, companies which specialized in serving certain industries and certain areas. Because most of these companies had set the quality standards in their own fields for years, many of their brand names have been retained for your convenience.

This is as it should be. These brand names *still* guarantee you satisfaction and quality. You have the added assurance that comes from knowing that these products are made under CF&I's exacting quality control—from ore to finished product.

In addition, you benefit from CF&I's efficient, nation-wide organization which gives you ever-available sales engineering services as well as prompt delivery. Next time you're in the market for steel or steel products, it'll pay you to contact CF&I.



THE COLORADO FUEL AND IRON CORPORATION

DENVER • OAKLAND • NEW YORK

CF&I FABRICATING PLANTS

The quality of CF&I steel products is firmly controlled since the requirements of each product determine the analysis of the steel.

CF&I Buffalo, New York

Fine and Specialty Wire of all types including Manufacturer's Wire (Basic, Spheroidized, Annealed, Tempered, Bright and Liquor Finish, Low and High Carbon)—Welded Wire Fabric—Chain Link Fence—Galvanized Strand.

CF&I Claymont, Delaware

Flanged and Dished Heads—Carbon and Alloy Steel Plates—Stainless-Clad Plates—Nickel Lectro-Clad Plates—Manhole Fittings and Covers—Large Diameter Welded Steel Pipe—Flame Cut Steel Plate Shapes.

CF&I Clinton, Mass.

Poultry Netting—Hex Mesh Nettings—Hardware Cloth—Industrial Wire Cloth—Alloy Processing Belts—Perforated Metals—Overhead Conveying Equipment—Sliding Door (Industrial) Hardware.

CF&I Mt. Wolf, Pennsylvania

Insect Wire Screening and Industrial Wire Cloth.

CF&I Oakland, Calif.

Fish and Crab Trap Netting—Stucco Netting—Poultry Netting—Hardware Cloth—Industrial Wire Cloth—Straightened and Cut Wire—Reinforcing Tie Wire—Mechanic's Wire—Chain Link Fence—Crimped Wire.

CF&I Palmer, Mass.

Wire Rope—Wire Rope Slings—Wire, all types (see Buffalo Plant)—Wire Clothesline—TV Guy Wire—Aircraft Control Cable.

CF&I Pueblo, Colo.

Bar, Rod and Structural Products—Grader Blades and Cutting Edges—Rails and Accessories—Chain Link Fence—Woven Wire Fence—Fence Stays—Fence Posts—Corn Cribs—Welded Wire Fabric—Nettings—Grinding Balls and Rods—Screen and Grizzly Bars—Rock Bolts—Galvanized Strand—Clothesline—Barbed Wire—Manufacturer's Wire (Basic, Chain, Spring, Stapling, Weaving, Welding)—Merchant Wire (Annealed and Galvanized)—Nails—Bolts—Nuts—Spikes—Seamless Casing and Tubing.

CF&I Roebling, N. J.

High Carbon Steel Wire (Hard Drawn, Spheroidized and Tempered)—Rope Wire—Tire Bead—Hose Wire—ACSR Core Wire—High Carbon Spring Steel Wire (All grades, tempers and finishes)—Regulator, Sash Balance and Flapper Valve Wire.

CF&I Roebling (Trenton), N. J.

High and Low Carbon Flat Wire (All tempers, edges and finishes)—Brush, Corset, Casing, Heddle and Drop Wire, Umbrella Wire and Tape Lines—Wire Rope—Strand, Aircord and Fittings—Wire Rope Slings—Electrical Wire and Cable and Magnet Wire.

CF&I So. San Francisco, Calif.

Galvanized and Annealed Merchant Wire—Galvanized and Annealed Stone Wire—Bale Ties—Baling Wire—High and Low Carbon Wire—Galvanized and Annealed Wire—Copper Coated Wire—Rope Wire—Welding Wire.

CF&I Worcester, Mass.

Valve and Clutch Springs—Starter Springs—Tire Chain Adjusters—Cross Chain Repair Links—Mechanic's Wire—Compression, Extension and Torsion Springs of all types—Formed Wires.

STEEL PRODUCTS

CF&I STEEL PRODUCING PLANTS

CF&I Pueblo, Colorado

Blast Furnaces and Open Hearths producing pig iron, ingots, blooms, billets and rods.

CF&I Buffalo, New York

Blast Furnaces and Open Hearths producing pig iron, ingots, blooms, billets and rods.

CF&I Claymont, Delaware

Open Hearths producing ingots and steel plate.

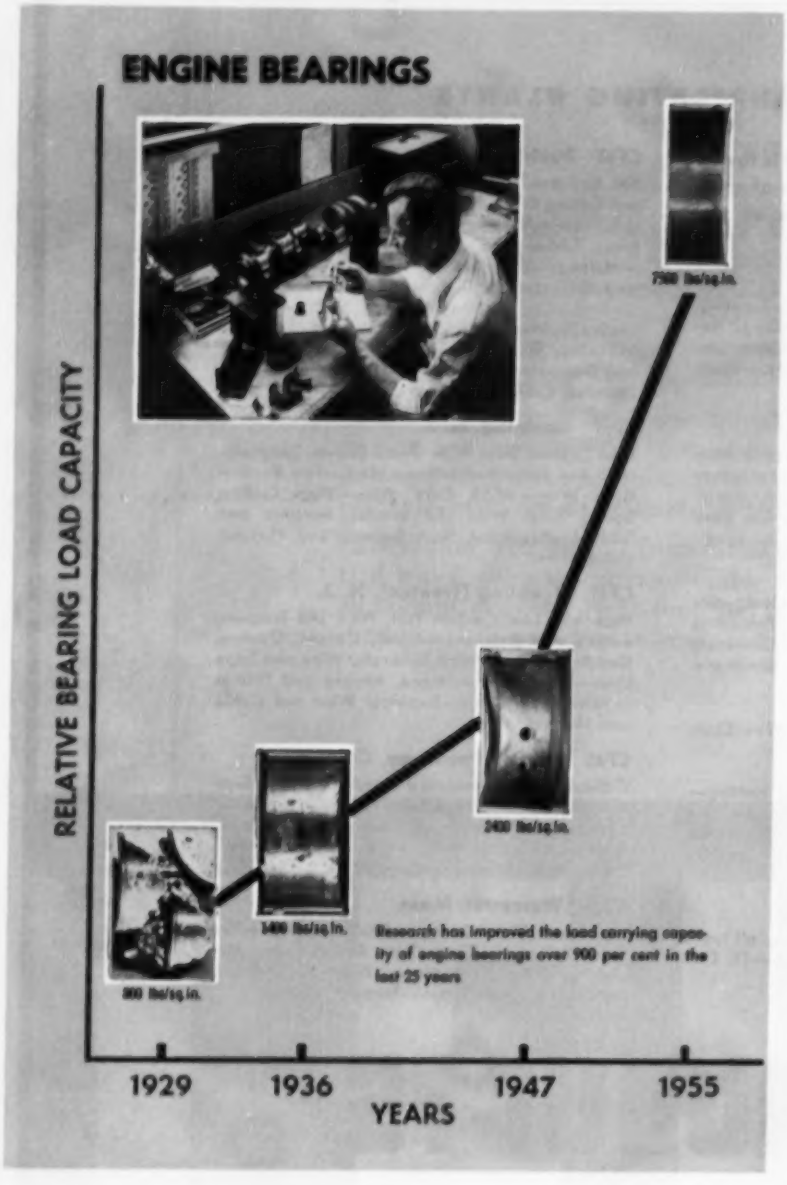
CF&I Roebling, New Jersey

Open Hearths producing ingots, blooms, billets, and rods.

CF&I Brooke, Pennsylvania

Blast Furnaces producing basic, Bessemer, foundry, malleable and low phosphorus pig iron.

3491



automatic assembly machines — one area in auto manufacturing where there's good opportunity for savings.

Generally, Process Development builds the first one, proves it out, then lets private machine builders pick up the job.

Standardize—The electronics department of Process Development is working on a "package circuit" program to give divisions a group of standard electronic units. The needs of the electronic groups within the corporation are quite similar.

Units are being designed for flexibility by standardizing dimensions, connections and mountings. This allows fast replacement of a defective circuit and minimizes machine down time.

Increased Life—Problem maintenance of automatic machines is receiving a lot of attention. Process Development engineers are working along three lines:

1. They are trying central, continuously running drive motors and using cams instead of cylinders or solenoids to move operating devices. Drawbacks: The system reduces flexibility and is suitable only for fairly small machines.
2. They are investigating larger and more rugged control equipment. Advantages: Controls are better able to handle fault conditions and there is less risk of damage by semi-skilled maintenance.
3. They are working with equipment that has a low power level. This is looked on as the most promising approach. Telephone-type relays and static contactless devices (such as Cypak) are being studied.

Process Development has installed a Cypak control system for test on one of eight vane loading machines in production at the Detroit Transmission Division.

Others—In addition to the Process Development Section, the Technical Center is the home of three other general staff organizations —Research, Styling and Engineering. It also has a Service Section which operates and maintains facilities and services for the entire Center.

The Technical Center serves the entire GM organization. A division can turn to any of the four general staff groups for technical facilities and services.

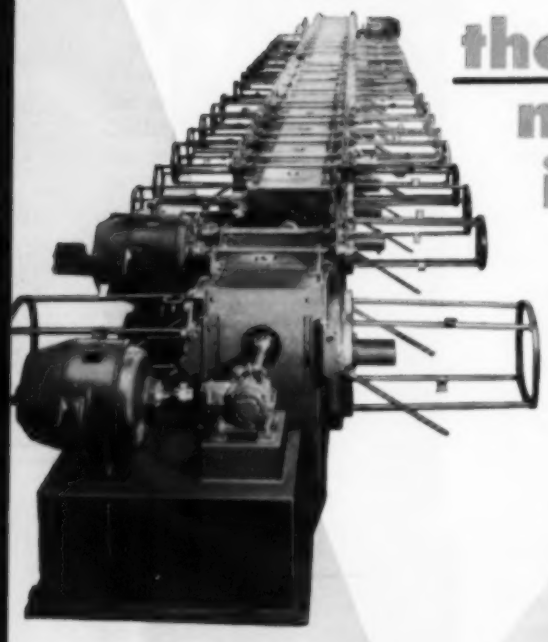
Serves All—Look at some of the other special projects the Process Development Section has handled. It reads almost like a directory of the corporation:

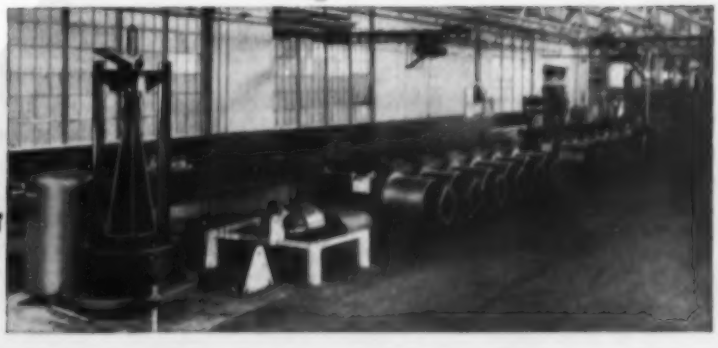
1. Electrostatic painting equipment—Saginaw Steering Gear.
2. Copper strip thickness gage —Harrison Radiator.
3. Barrel core blowing machine —Chevrolet-Saginaw Foundry.
4. Gearbox dynamometer test stand—Buick Motor.
5. Hydramatic torus assembly machine—Detroit Transmission.
6. Plaster mixing machine—Fabricast.
7. Radiator cap assembly machine—A C Spark Plug.
8. Pump vane sorting machine —Detroit Transmission.
9. Zinc diecast deburring ma-

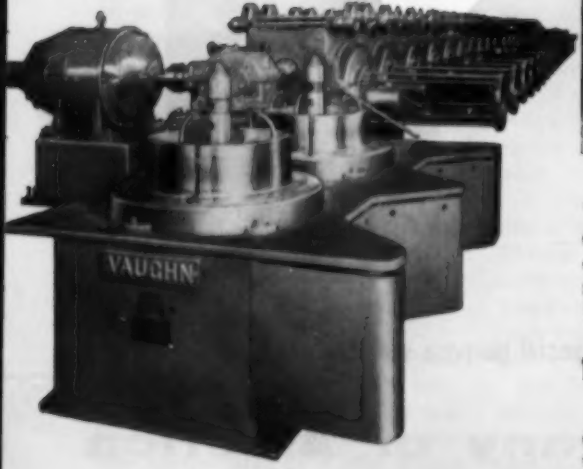
In TAKE-UP FRAMES

the name is-

Vaughn®







Vaughn Take-Up Frames incorporate the complete experience of the Vaughn organization in manufacturing wire drawing equipment of every type—to the most exacting standards of profitable performance for the customer. *We'll be glad to detail the advantages to you!*

The VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Crucible gives you
wide selection,
dependable delivery of

Cold Rolled Specialty Steels

For a *full* selection of cold rolled specialty steels — call Crucible. Deliveries are on-schedule — in the size, grade, finish or length you need.

And Crucible's new mill facilities mean closer control of rolling . . . insure greater physical uniformity . . . fine finish . . . better edges . . . flatter strip.

Whether you use carbon spring steel, alloy strip steel, or many other ferrous analyses that can be cold rolled, you can't beat Crucible. More information is contained in the 32-page booklet, "Cold Rolled Specialty Steels". Write for your free copy now. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

This experimental foundry is under Research Staff

Engineering staff has facilities for limited production.

chine—Rochester Products.

10. Fuel control test stand—Allison.

How It Works—If a GM division needs help, it may contract for special projects with the Tech Center's general staff groups. But the staff units are on their own in the research, engineering, styling and process development fields.

They have a management mandate to explore the future, develop and try out new ideas, new techniques and processes. If any show promise, divisions can adopt them.

For instance, Process Development has equipment for cold extrusion of steel. On short notice, it can evaluate potential applications in any GM plant.

The carbon dioxide process of mold hardening is being studied to see how it might benefit the many GM foundry operations.

Must Sell Idea—Technical Center staffs have no direct product responsibility. Likewise, they have no power to enforce their ideas.

Any new development must be "sold" to a division on its own merits, just as any development by a supplier outside GM must be sold.

Storehouse — It's natural that much new data will originate within divisions. Such information is channeled to Tech Center general staff groups. In a sense, the Technical Center is a clearinghouse for information.

Fisher Body—expert in sheet metal fabrication—may need help in electronics. Another division may need the fabrication knowledge accumulated by Fisher Body.

Focus—Main emphasis is on engineering and research versatility. But no fixed boundaries are set up.

For example: Engineering Staff has a Power Development Group working on automotive engines. Research Staff has an Automotive Engines Department.

On occasions they may overlap. They may even be competitive. Both design, build and test experimental engines.

Generally, Research Staff concentrates on fundamental problems, working with engines that may not be practical for years. It was working with 12 to 1 compression engines immediately after World War II.

Engineering Staff's Power Development Group is more concerned with engines fairly close to production models, the type power package the customer is familiar with.

Different Areas—Both Research and Process Development have plating laboratories. Research's electrochemistry department mainly is involved in the experimental end of electroplating. Process development specializes in electroplating from the production standpoint.

A project may start with Research and be carried on through Process Development — although there are many exceptions. Some Research projects move straight from the laboratories into production.

But Tech Center scientists have learned that most experiments must have long development and pilot-plant testing before they charm a GM chief engineer or manufacturing boss.

The Money—There are two main sources of income: First, the costs of operation are defrayed (pro rata) by divisions as part of their overhead. This system underwrites projects started by the general staff which are intended to benefit GM as a whole.

The second source of income is special projects. If a division contacts Research or Engineering with a problem or project, it is billed. Process Development quotes on building special machines just as if it were an outsider.

Or if some project interests a certain group of divisions, they are charged for the service.

This means the Technical Center staff organizations operate much the same as any independent research organization.

Eye Appeal — Styling operates under the same policy. Costs of its services are pro rated among the automotive divisions, just as they would be if the divisions contracted for their styling on the outside.

Styling's functions differ somewhat from those of Research, Engineering and Process Development. Primarily, it affects the looks of GM products—autos, trucks, refrigerators and locomotives.

But even problems of appearance often must be co-ordinated with engineering and manufacture of a product. It means that stylists and designers must keep in touch with what goes on in other groups at the Technical Center.

NO MATTER WHERE IT'S GOING...

Protect it with **Wrap·DRI!**

SLASH DAMAGE COSTS...

Safeguarding steel and metals—and thousands of other products from the ravages of weather is a simple task with multipurpose Wrap-DRI. Bulky, heavy-duty products as shown here, naturally demand extra sturdy, dependable Wrap-DRI to prevent costly scratches, rust and corrosion damage claims.

DOUBLE WATERPROOF PROTECTION — Each outer sheet of Wrap-DRI's tough kraft is asphalt coated to eliminate voids and provide double insurance against moisture transmission.

MAXIMUM STRENGTH REINFORCING — Wrap-DRI'S closely woven "controlled pattern" fibre reinforcing, firmly bonded in asphalt, greatly increases strength and resistance to puncture and tears.

NO JOB IS TOO BIG — Wrap-DRI is available up to 10' wide which means fewer lapped joints on large jobs — Ideal for "Carload Coverage".

GRADES TO MEET YOUR NEEDS—Wrap-DRI comes in medium, heavy and super grades or "tailor made" for any requirement.

TELL THEM WHO YOU ARE...

Wrap-DRI as well as any other Thilco protective paper can be Print Decorated for identification, advertising and added selling power for *very little extra cost!* **OTHER THILCO PROTECTIVE PAPERS INCLUDE:** Glassines and Grease-proofs, Moisture-vapor barriers, Special treatment papers, MG and MF krafts, Decorated papers and bags.

Write for free sample kit of Wrap-DRI and other Thilco functional papers with case histories today.

THILCO

Functional Papers FOR PROTECTION THAT COUNTS!

NEW YORK • CHICAGO
CINCINNATI
DETROIT • MINNEAPOLIS

THILMANY PULP & PAPER COMPANY
KAUKAUNA - WISCONSIN

Hurricane Test

Designs for window structurals need unusual testing to show up hidden flows

STEEL windows get the 150-mph, storm treatment in the test chamber at Truscon Steel Division, Republic Steel Corp., Youngstown. The rugged check reveals flaws in design that won't show up any other way.

Largest—Said to be the largest of its kind, the chamber is 20 ft tall, pumps its own water against the windows being tested. Prototypes can be evaluated before sending them to independent laboratories for a final check.

The test chamber looks like a giant metal sandwich which can be rolled apart to permit inspection and installation of window samples—they range from small residential sizes to the large units for skyscrapers. The chamber develops wind and water pressure in one-half the sandwich. This "weather" is hurled against the window sample in the other half.

WIND AND WATER
. . . test this window at 150 mph

Role—A window maker supplies only the frame, relying on local contractors to make a good seal. Architects and builders want to be assured of a good seal, so Truscon tests complete windows, makes recommendations.

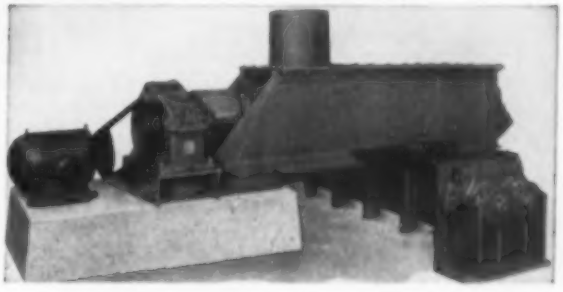
One thing it found was that extreme care must be taken to make an unbroken run of glazing compound.

Screw Feeder Regulates the Flow of Flue Dust and Ore Fines

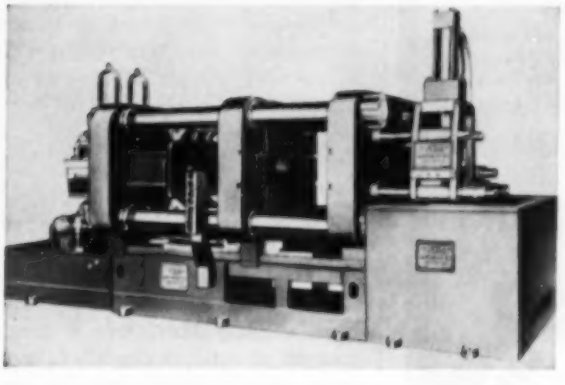
Granular materials are moved by the screw feeder. It regulates flue dust feed from dust catchers and hoppers to pug mills, conveyors and bins.

A uniform flow is maintained where irregular feeding may be caused by hanging of material or a sudden furnace slip.

The screw is made in sections for easy replacement. Roller bearings are mounted in cast iron housings. A square shaft simplifies screw replacement. *Write*: William M. Bailey Co., 1221 Banksville Rd., Pittsburgh 16, Pa. *Phone*: Lehigh 1-6131



Automatic 1000-Ton Diecasting Machine Casts 14 lb in Aluminum



Model BH-60 has 72 x 54-in. die plates that provide a 40 x 32-in. space between tie bars. The die opening stroke of 24 in. is completely adjustable.

The hydraulic system is capable of putting the machine through eight free cycles a minute, with injection pressures up to 32,000 psi and injection speeds up to 1000 fpm.

For making zinc castings, the machine is built with a plunger gooseneck. A cold chamber design is used for producing aluminum and magnesium diecastings.

The machine can inject up to 49 lb of zinc and makes parts such as auto grilles and grass mower covers. *Write*: Kux Machine Co., 6725 N. Ridge Ave., Chicago 26, Ill. *Phone*: Ambassador 2-3070

Blast Tumbling Machine Throws 830 lb of Abrasive a Minute

The Super Tumblast has an operating load capacity of 28 cu ft. It cleans sand, scale, oxides and other contaminants from any work that can withstand a tumbling action.

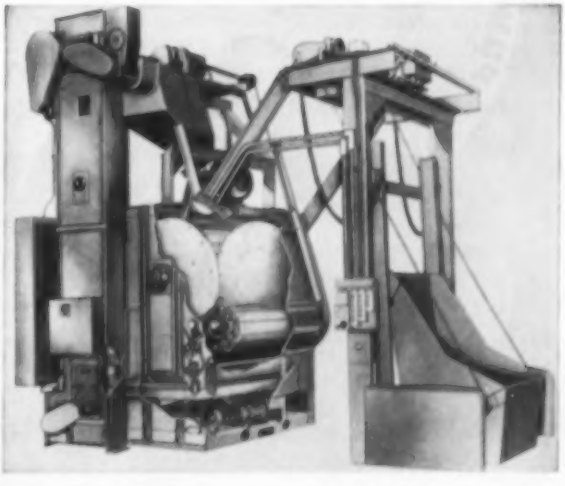
Only one abrasive hurling wheel is used. Its abrasive shower is spread uniformly over the cleaning chamber.

Wear problems are reduced by the use of liners that last from 25 to 50 times as long as the standard ones previously used. The blades in the hurling wheel last twice as long.

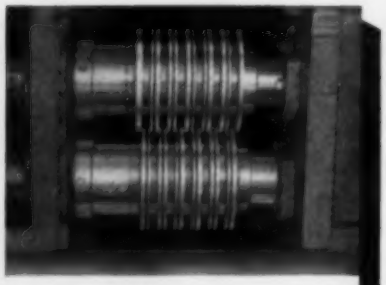
The abrasive separator achieves 300 per cent greater efficiency than previous models.

A steel flight conveyor (said to be the tightest ever used in blast equipment) seals the abrasive in the machine.

A single pushbutton actuates the entire sequence from loading to unloading. *Write*: Wheelabrator Corp., Mishawaka, Ind. *Phone*: Blackburn 5-2141



COWLES
SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

Engineering Assistance On Any Slitting Job!

COWLES TOOL CO. 2086 WEST 110th STREET CLEVELAND 2, OHIO

Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

★ PUNCHES ★ DIES ★ RIVET SETS ★ COMPRESSION RIVETER DIES ★

We carry your inventory.
Large stock for your convenience.
Special tools to order.
Quality and workmanship guaranteed.
Prices on Application.
Write Dept. A for New Catalog 54

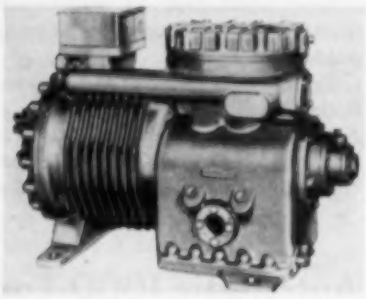
GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

NEW PRODUCTS and equipment

Compressor

The 10-hp unit is suction cooled and designed for air conditioning uses.

Displacement is 1375 cfh at 1750 rpm. Bore of the three cylinders is 2 3/16-in. The stroke is 2 in.



The use of refrigerant (F-22) to cool the motor windings eliminates compressor cooling fans or water connections. The unit weighs 337 lb. *Write:* Copeland Refrigeration Corp., Sidney, O. *Phone:* 2167-1

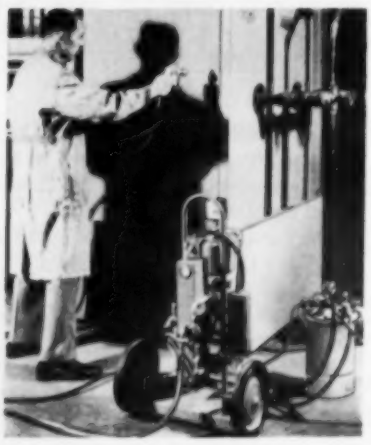
Paint Heater

The portable paint heater brings the hot spray process to the job site.

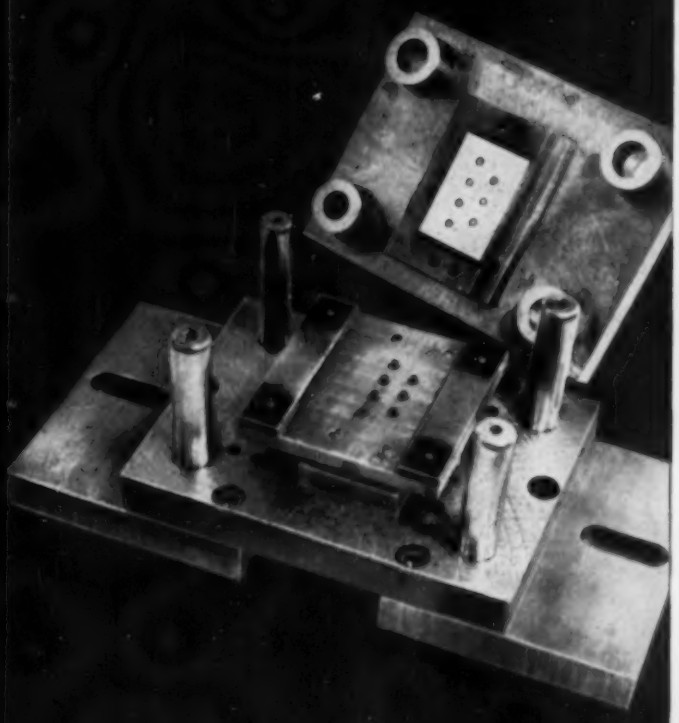
With the heater, the painter applies a heavy film since a great amount of solid is deposited in a given area. While applying the dense coat, the painter saves material costs. Overspray and fog are reduced as much as 75 per cent.

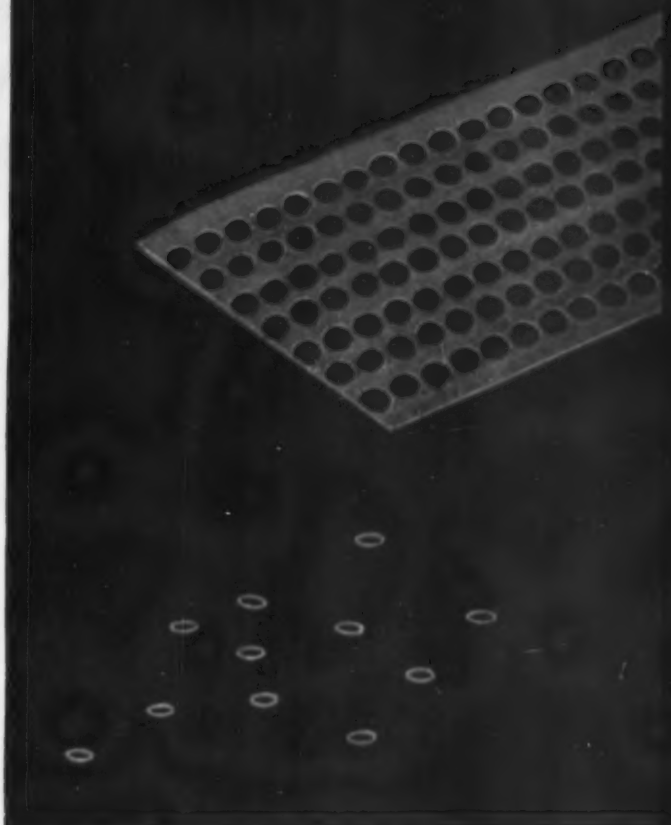
Air consumption is cut because low atomizing pressures are used.

Heated materials take some of



FIELD REPORT: NO. 87





WHICH DIE STEEL WOULD YOU USE HERE to boost production per grind 500%?

These tools blank out dead soft brass washers, .170" O.D. x .100" I.D., .009" thick, on a punch press at 186 strokes per minute. It is an exacting job for a couple of reasons. First, it involves a government contract and strict delivery schedules have to be maintained. Then too, the punch and die are set up to blank seven washers per stroke and have to do this for many millions of pieces . . . and still remain within burr limitations set up by the government. Performance from the steel used in the past was far from satisfactory . . . to maintain schedules, production had to be substantially increased.

Suppose the decision were up to you. Which die steel would you be willing to recommend for steady, trouble-free production?

In this Field Report from customer files, here's what happened: The Carpenter Matched Set Diagram was consulted and Carpenter No. 610 (Air-Wear) was selected. Since then No. 610 has enabled the Company to hold delivery schedules comfortably . . . racking up increases in production per grind as high as 500%. And this is especially significant when you realize that five hours' downtime is involved each time the tools have to be reground. Total parts to date: 5,500,000 . . . and the tool is still good for about 15 regrinds of .003" each.

Why make the tough decisions alone, when Carpenter's service organization is sincerely interested and equipped to work with you? A move in the right direction would be to call your nearest Carpenter Mill-Branch Warehouse, Office, or Distributor, now.

Your toolroom can use Carpenter Matched Tool and Die Steels to:

- Reduce hardening hazards
- Minimize machine downtime
- Boost output per grind
- Improve product quality

Carpenter STEEL

Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks—The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Export Address: Port Washington, N. Y. — "CARSTEELCO"

76 MILLION welding rods through these **CROMOVAN** feed rolls!

36 months service and still going strong!

CROMOVAN, a Firth Sterling air hardening, high carbon–high chrome die steel is a terrific performer in wear and abrasion resistance applications.

For example, carbon steel feed rolls at Marquette Manufacturing Company, Minneapolis, lasted only seven months even when serviced constantly, but CROMOVAN replacements are still going strong after 36 months of grueling use and *no* servicing! Four feed rolls guide 14" welding rods (stainless, carbon, and alloy steel) into a flux coating machine at 700 ft. per minute and 76,000,000 rods passed through them with only .022" groove wear and *no down time* for redressing.

You, too, can realize comparable savings, reduced maintenance, and higher production when you adopt CROMOVAN for feed rolls, guides and wear parts. Write for Technical Bulletin 20-010 or 20-011 (Free Machining), today.

Mr. Tooley says—

"Firth Sterling offers the advantage of a single source of supply for both tungsten carbides and high grade tool and die steels for every shop tooling purpose. Because we have both you get unbiased recommendations."

R-310

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS: McKEESPORT, TRAFFORD, DETROIT, HOUSTON

OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND DAYTON DETROIT* HARTFORD* HOUSTON LOS ANGELES* NEW YORK PHILADELPHIA PITTSBURGH WASHINGTON WESTFIELD, N.J.

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium

the work out of spraying. Because the gun is moved slowly, accuracy and control are improved.

The units are made with 3 or 6-kw heaters. With the larger model, more than one spray gun can be used. *Write*: DeVilbiss Co., 300 Phillips Ave., Toledo 1, O. *Phone*: Kingwood 5411

Part Separator

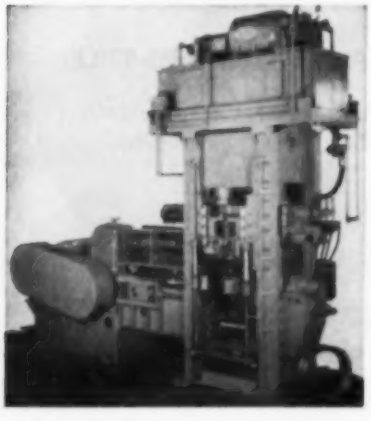
The mobile magnetic part separator will remove parts from deburring chips, etc. It will separate 7 cu ft of parts and chips in 10 minutes.

The unit is equipped with a demagnetizer and eliminates hand picking and screening. *Write*: Stearns Magnetic Inc., Milwaukee 46, Wis. *Phone*: Evergreen 3-4800

Rim Roller

Wheel rims are fed and transferred automatically by conveyors.

Supporting the bottom and top work roll shafts eliminates deflection of the roll shaft. During



When you buy *Acme-Gridley* you get **SERVICE** *ANYTIME, ANYWHERE*

While your Acme-Gridley is being assembled, you may send your men to our plant to learn about tooling, camming and maintenance of your machine to insure *continued* top performance. Or, a competent demonstrator will perform the same function at your plant, upon delivery of your machine.

Either way, this service is supplemented by numerous service books, instruction manuals and parts catalogs. And, if you start a *training program*, this supplemental material will implement it.

National Acme

The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

THE NATIONAL ACME COMPANY • 189 East 131st Street, Cleveland 8, Ohio

Unique test furnace assures you of better end wall service

with Kaiser Periclase-Chrome Brick

THE refractory test furnace shown at the right was designed by Kaiser Chemicals to aid in the development of superior basic refractories for the steel industry.

One of the most important of its functions is to regularly test the effect of iron oxide and steel furnace slag on various bricks—including Kaiser Periclase-Chrome Brick.

As a result of such careful quality development and control, Kaiser Periclase-Chrome Brick are superior in your furnace—assuring less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Leading steel producers have found that Kaiser Periclase-Chrome Brick can greatly increase end wall life or greatly reduce wall thickness, when this is preferred.

Let your Kaiser Chemicals sales engineer show you how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

***Now available!* A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

Saves 40% Space!

STRONGER, TOO

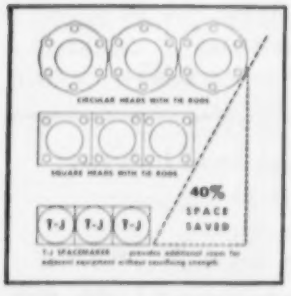
Than Outmoded
Tie Rod Cylinders!

Only T-J

Spacemaker CYLINDERS

Offer All The Extras As Standard!

- NEW *exclusive* Ingenious Cushion Designs . . . Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion
- Compact design eliminates tie rods, saves up to 40% space
- Proven Performance . . . with Extra High Safety Factor
- Hard Chrome Plated Bodies and Piston Rods (Standard, at no extra cost)
- Oil pressure up to 750—AIR to 200 P.S.I.



NEW LITERATURE . . . send today for new Bulletin with complete details of Spacemaker line.

You'll find many answers to *automation* in your plant with T-J Spacemaker Cylinders! Designed with years-ahead features for top performance and dependability. Wide range of styles, capacities . . . for all kinds of push-pull-lift operations . . . reduces man-hours and costs! Write The Tomkins-Johnson Co., Jackson, Michigan.

MEMBER OF THE NATIONAL FLUID POWER ASSOCIATION

T-J TOMKINS-JOHNSON
RIVETORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

NEW PRODUCTS and equipment

transfer, the bottom roll retracts on its axis out of the rim's path.

A direct connection with the top ram gives vertical motion to the conveyor. Side and center guides also are mounted on the upper ram. *Write*: McKay Machine Co., Youngstown 10, O. *Phone*: Riverside 6-6521

Threading Lathe

Model 1240 is a single-point machine which cuts internal and external right and left-hand, taper and multistart threads automatically.

A pressure indicator built into the live center of the tailstock allows the operator to determine tool pressure and heat distortion at a glance.

The lathe has a capacity of 55 in. of thread length and will swing up to 12 in. Working speeds go up to 2000 rpm.

Tools can be changed in less than 1 minute; an average setup takes up to 10 minutes. *Write*: Man-Au-Cycle Corp. of America, 132 53rd St., Brooklyn 32, N. Y. *Phone*: Hyacinth 2-6560

Tool Grinder

The Style 48-B double-end tool grinder is equipped for wet or dry face grinding of large, single-point tools. It can be used for roughing all sizes of shanks. With suitable wheels, the machine will recondition high speed steel, cast alloy and carbide tools.

Two 10-in. plate-mounted wheels are used. The wheelshaft rotates in heavy-duty, double-row ball bearings, permanently lubricated

All it takes is a local phone call to your Disston distributor. He will give you prompt, personal service from his nearby well-stocked warehouse . . . help you avoid production slowdowns.

YOUR DISSTON DISTRIBUTOR ALSO OFFERS YOU:

Large economies. Your Disston distributor carries a wide inventory of the Disston tools you use regularly. Your purchasing, receiving and bookkeeping procedures are simplified—thus reducing your costs.

Sound advice. Your Disston distributor is a well-informed specialist, having wide experience in solving metal-cutting problems. As a center of information, he can help keep you informed of the latest developments in your field.

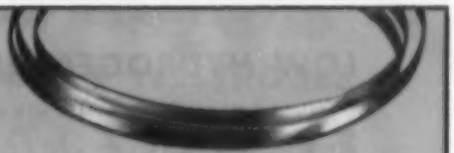
To learn more about the Disston line of fine tools—and how you can profit from using them in your plant—call your local Disston distributor.

Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.
526 Tacony, Philadelphia 35, Pa.

YOUR DISSTON DISTRIBUTOR STOCKS THESE QUALITY DISSTON TOOLS:

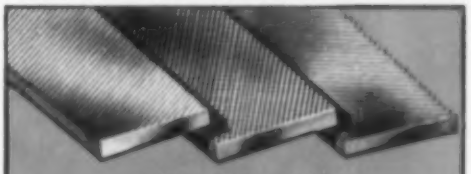
DISSTON HACK SAW BLADES

Sharp, clean-cutting blades for hand and machine use. Blades are carefully milled, accurately set. Wide selection: Super-Safe, High Speed Steel, Di-Mol, Chromel and Duraflex.



DISSTON METAL CUTTING BAND SAWS

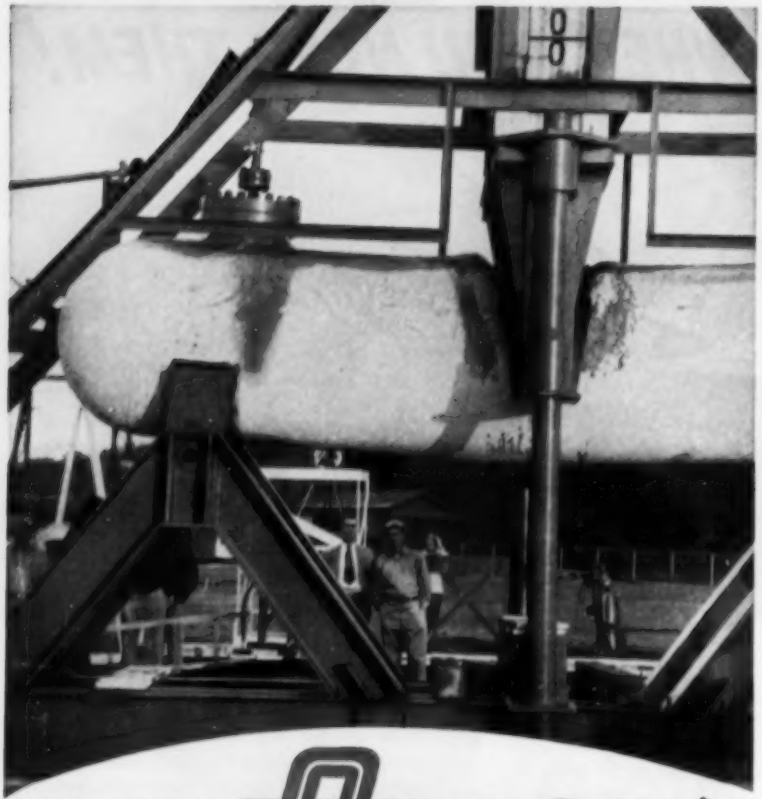
Uniform hardness and temper, durable edges. Made in both Hard Edge Flexible Back and Hardened Throughout styles.



DISSTON FILES

Rugged, long-lasting files for every purpose. Wide selection: exclusive *Bite-Rite*® American Pattern files, versatile Multi-Metal files and precision-made Superfine® Swiss Pattern files.

Proof of how to weld Constructional Alloy steels for maximum strength



WELD WITH ARCOS

LOW HYDROGEN ELECTRODES

The above test vessel* was welded with ARCOS Low Hydrogen Electrodes without stress relieving. After being refrigerated to −33°F, and pressurized to 1,875 p.s.i., a 13-ton ingot was dropped on it from 73 ft. All steel and welds remained intact—proof of how Arcos weld metal can meet the severest requirements of strength, low temperature impact, and pressure. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

*Made of USS "T-1"—new super tough alloy steel developed by U. S. Steel. Test conducted jointly by Chicago Bridge & Iron Co. and U. S. Steel.

NEW PRODUCTS and equipment

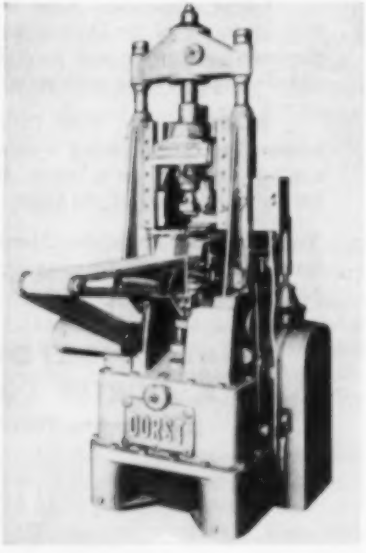
and sealed. Spindle drive is through a V-belt from a reversible motor in the base of the grinder. Tool rest tables are adjustable: 1. To get required tool sharpening angles. 2. To compensate for wheel wear.

A pressure coolant system, with its own tank and pump, is provided. Coolant at each wheel is controlled by an individual valve. Splash guards prevent waste of coolant. *Write:* Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone:* Townsend 8-3900

Powdered Metal Press

An automatic press can make from 4 to 20 pieces a minute. Filling, pressing and ejection of the material are automatic.

A pick-up mechanism and conveyor belt remove the pressed



parts automatically. The 110-ton press has a variable speed drive. *Write*: Arnhold Ceramics Inc., 1 E. 57th St., New York 22, N. Y. *Phone*: Plaza 5-1456

Production Borer

Production center drilling, drilling and boring are speeded by this precision hole borer. Hole spacing and bore accuracy are held within 0.0001-in.

The machine handles a wide range of parts and hole requirements. A line of boring bars, collets, drill chucks and facing heads are available. *Write*: Canton Tool Mfg. Co., East Canton, O. *Phone*: Glendale 2-4218

Grinding Machines

The 12-in. grinder has infinitely variable feed rates from 3 to 240 ipm. Headstock speeds are

A sure way to meet every demand when welding high strength steels

WELD WITH ARCOS

LOW HYDROGEN ELECTRODES

Low hydrogen electrodes are no "stepchild" at Arcos. They're manufactured under the same high standards as stainless—to meet exacting conditions. For example, welds in a dipper that will chew out 45 cu. yds. of stony soil in one bite must be strong, and must resist abrasion, shock and fatigue. Where strength is of primary importance, Arcos ELECTROPAKED Low Hydrogen Electrodes, frequently without preheat, are the "sure way" to get quality weld metal . . . . easily deposited every time. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

from 55 to 550 rpm. An infinitely variable mechanical drive provides constant horsepower output at all speeds.

An internal grinding attachment is hinge mounted on the front of the machine where it can be swung down quickly.

Controls are grouped at the front of the machine for the operator's convenience.

Also available: 14 and 18-in. machines. *Write:* Cincinnati Grinders Inc., Marburg Ave., Cincinnati 9. O. *Phone:* Redwood 2121

Blower Motor

The integral drive blower motor is expected to revolutionize centrifugal blower design.

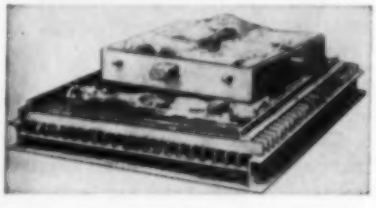
The rotor is on the outside and revolves around a stationary shaft and field coil assembly. A flange on the rotor connects to the blower wheel and makes the motor an integral part of the wheel, eliminating the need for belts, pulleys and special motor mounts.

The blower wheel and motor share a common shaft. The motor is dynamically balanced for mechanical and electrical imbalance. *Write:* Electronics Division, Iron Fireman Mfg. Co., 2838 S. E. Ninth Ave., Portland, Oreg. *Phone:* Belmont 4-6551

Foundry Shakeout

Powerful vibrations of the Syntron-Sinex shakeout separate hot sand from castings quickly and easily.

The shakeout is made of a rigid steel frame mounted on vibration dampeners. A vibrator is fastened beneath the grid and protected from the sand by metal shields.



The unit operates on 220 or 440 volt, 3-phase, 60-cycle current. *Write:* Syntron Co., 370 Lexington Ave., Homer City, Pa.

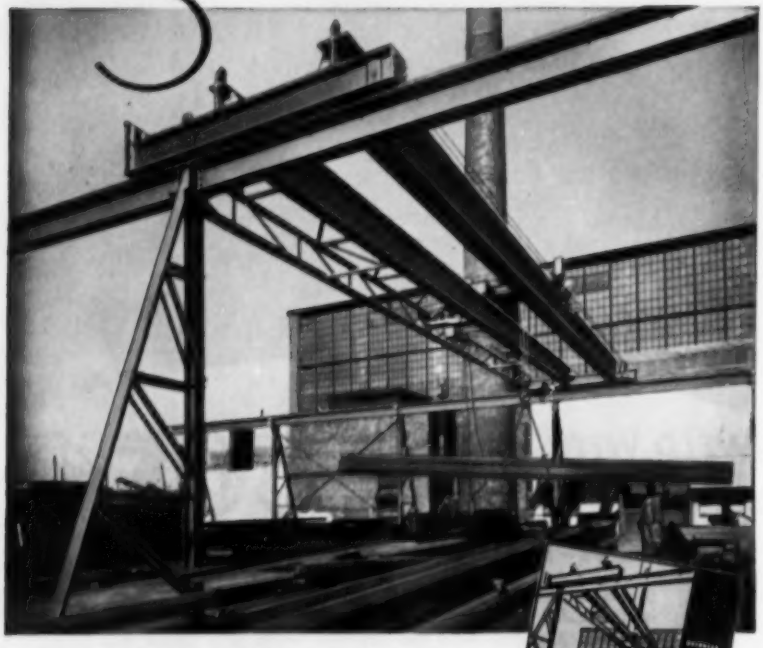
Hardness Tester

The Micro-Hardness tester and metallurgical microscope has a load weight range of 25 to 1000 grams.

Only 1 minute is needed to test small diameter wires, material coatings, thin sheet stock, cutting tool edges, ball bearings and small, precision ground or lapped parts.

When the instrument is used as a metallurgical microscope, the in-

3 reasons why...



CRANEMASTER

CRANEMASTER is your top value!

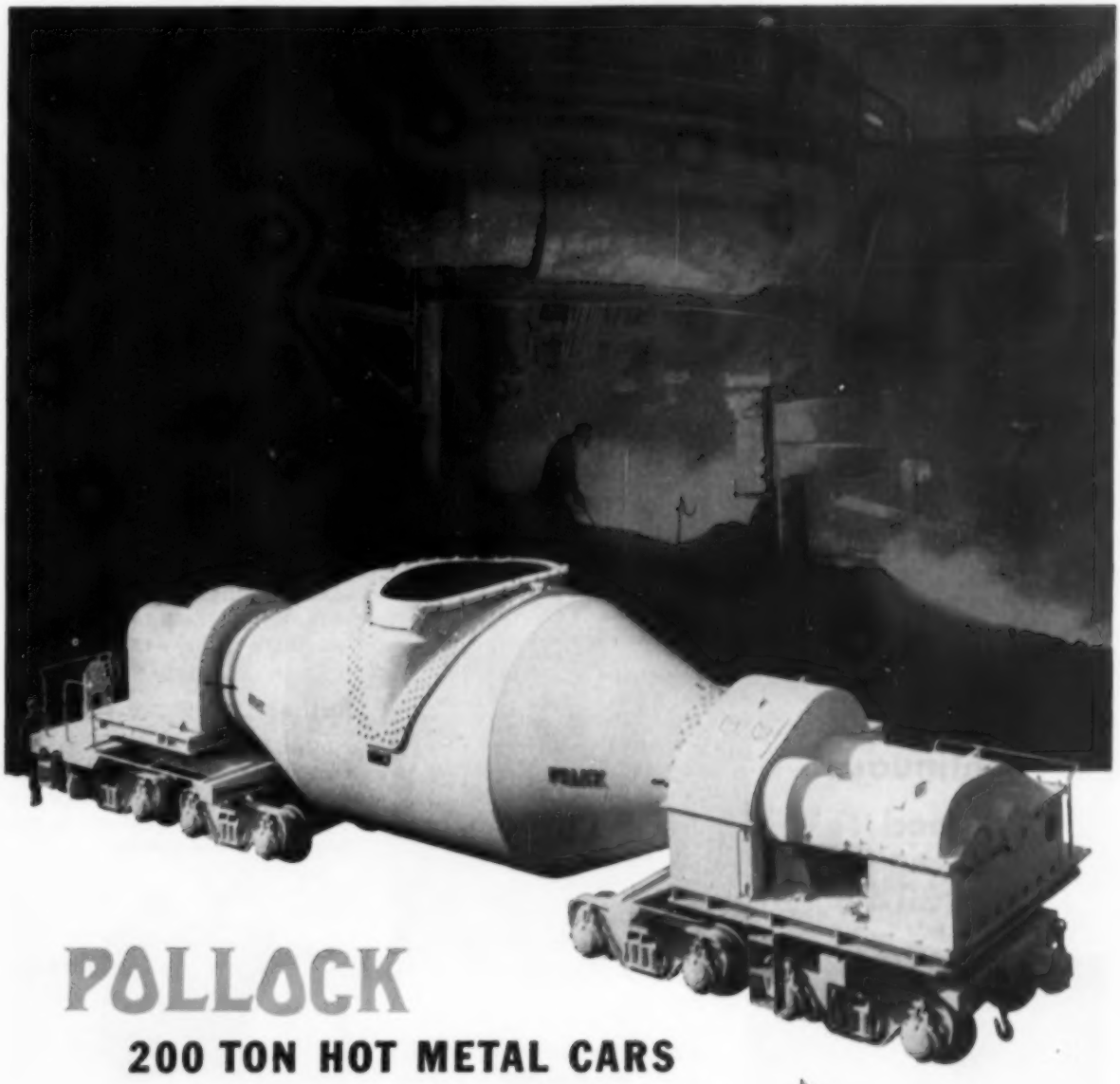
- *You save on engineering cost* because there's a *standardized* CRANEMASTER for virtually every building condition.
- *You save on production cost* because time and material savings of modern manufacturing techniques are passed along to you.
- *You gain long term efficiency,* because CRANEMASTER is soundly designed and carefully built for maximum performance, minimum maintenance.

CAPACITIES to 15 TONS—SPANS to 60 FT.

send for BULLETIN C-110

Describes in detail the many design and operating advantages of CRANEMASTER overhead traveling Cranes. Also explains how Abell-Howe provides competent service from original survey to final installation.

ABELL-HOWE COMPANY 7747 Van Buren Street • Forest Park, Illinois



POLLOCK

200 TON HOT METAL CARS

Engineered for U. S. Steel's Fairless Works

● Four engineering advances set this newest Pollock hot metal car apart from ordinary cars. First: Main bearings, self-aligning by spherical bushings, eliminate binding when operating on rough or uneven tracks. Second: Welded steel car bodies and ladles. Third: Main bearings lubricated on bottom halves with grease pressure pumps. Fourth: Gear reducer on the tilting drive has pump lubrication to all gears and bearings.

This car was designed and built by Pollock to meet the particular requirements of the Fairless blast furnace and steel plant.

Pollock has supplied equipment to the iron and steel industry for 92 years. Let them help you analyze your heavy equipment needs.

Dumping mechanism with protecting covers removed.

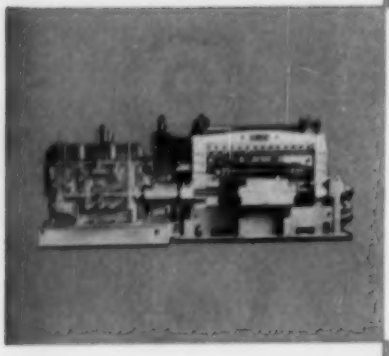
POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN, OHIO

STEEL PLATE CONSTRUCTION • ENGINEERS • FABRICATORS • ERECTORS

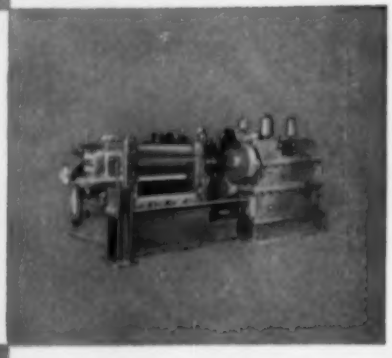
BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

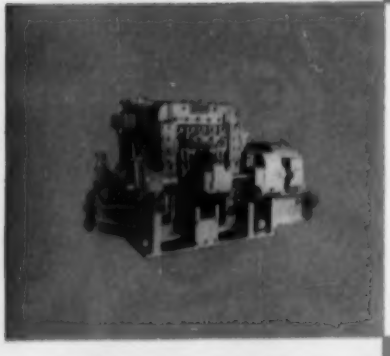
flexible design



cutting accuracy

continuous feed





rugged construction

Automatic Shears

by HALLDEN

"the shearing specialists"

THE HALLDEN MACHINE CO.

THOMASTON, CONNECTICUT

Sales Representatives

The Wean Engineering Co., Inc., Warren, Ohio (Ferrous)

T. E. Dodds, Pittsburgh, Pa. (Non-Ferrous)

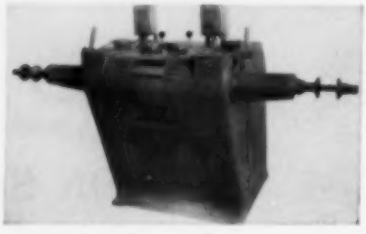
W. H. A. Robertson & Co., Ltd., Bedford, England (Ferrous & Non-Ferrous)

NEW PRODUCTS and equipment

terchangeable objective lenses provide magnifications of 200 and 400X. *Write*: Sheffield Corp., Dayton, O. *Phone*: Kenmore 3131

Buffing Lathe

Model VRROW is a two-spindle, variable-speed buffing and polishing lathe. It has a 20-in. swing—from the side of the base to the face of the inner flange.



The spindles operate independently; each has its own motor and variable-speed control. Spindle speeds can be changed instantly while the lathe is running. *Write*: Department 1611, Hammond Machinery Builders Inc., Kalamazoo, Mich. *Phone*: 5-7151

Storage Batteries

A new line of Exide-Manchex batteries features long life and high instantaneous discharge rates. Encased in heat - resistant polystyrene jars, the batteries are designed for stationary power applications in industry.

Other improvements: Reduced

Our challenge stands

...anything that can be made of steel sheets can be made of

Now we are not suggesting you fabricate a violin out of Wheeling SOFTITE. But it is reassuring to know that *if you wanted to,* here is one sheet that can take every bend, every fold, every intricate turn without peeling or flaking.

Incredible? Amazing? That's Wheeling SOFTITE... the tightest coated sheet yet produced. So tight-coated, in fact, you can use it to make *anything* you can make out of steel sheets.

Yes, SOFTITE, made by the same company that developed Cop-R-Loy, the original copper-bearing steel pipe...and DUCTILLITE, the original cold reduced tin plate. Now SOFTITE, the ultimate in ductile, tight-coated galvanized steel, a product of Wheeling Steel Corporation, Wheeling, West Virginia.

WHEELING

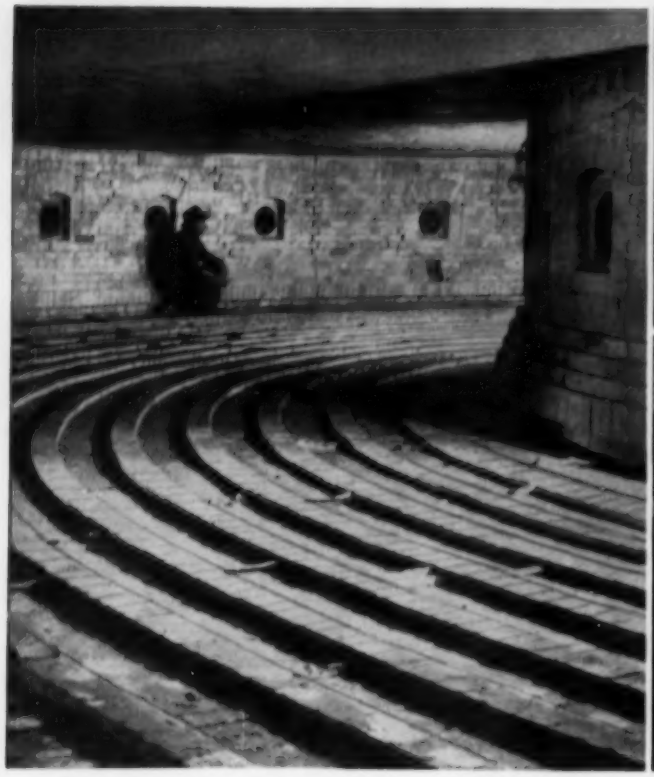
SOFTITE

GALVANIZED SHEETS

IT'S WHEELING STEEL

District Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling.

Profitable trends in the use of refractories



Laclede-Christy offers simplified way to get exact-purpose fire brick

It's highly profitable, of course, to use refractories exactly suited to each application. There's a simple way to do this. That is to rely upon one source which offers you each refractory type and grade you may need—plus the quality and service you expect.

Laclede-Christy produces 68 different varieties of fire brick and other refractories—to meet a wide temperature range. From this outstanding selection you are certain to obtain the types and grades that serve your needs best.

Laclede offers you refractories custom-typed for your use—not just a product line. Laclede brands such as Spallac, King, Laclede 70, Peerlac, Wallac, Canon City, Marvel and Clearco justify their excellent reputation and acceptance. Laclede checker brick, cupola blocks, tile and many other items also meet Laclede's and your "quality-first" standards.

If you need help to determine your exact-purpose fire brick, Laclede-Christy offers that too. So, for a profitable trend in *your* use of refractories, get together with Laclede soon. Your representative is nearby.

LACLEDE-CHRISTY COMPANY DIVISION

LACLEDE-CHRISTY COMPANY — FOUNDED 1844 — Quality First

HKP — H. K. PORTER COMPANY

H. K. PORTER COMPANY, INC.
2000 Hampton Ave. · St. Louis 10, Missouri

maintenance because of less frequent additions of water, more effective sealing and easier cleaning, ready adaptability to cycle and

float service. *Write*: Department M., Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa. *Phone*: Walnut 2-4815.

Metal Cleaning

The automatic water washer cleans metal parts or products. Work flows automatically through a straight-line process.

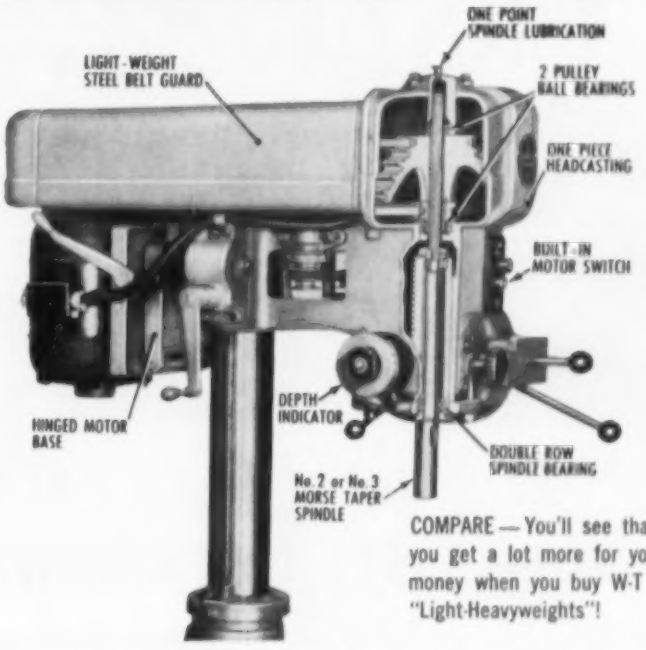
An alkaline-base detergent or acid removes grease, dirt, grit or dust. Tap water rinses and drying cycles follow. Final rinsing is with deionized water.

As products come off the conveyor belt, the washer prepares them for finishing operations or immediate packaging. *Write*: Stoelting Bros. Co., Kiel, Wis.

Shear Line

A shear line that works with a standard shear is fully automatic and holds commercial tolerances. It has an air-operated shear clutch

W-T WALKER-TURNER



COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

Here's the inside story of fast, accurate production!

The features you see here add up to unusually fine engineering — the kind you normally find only on heavy, expensive drill presses. But Walker-Turner's 20" press gives you the combination you want — high production rate, at low initial cost.

You can have this W-T 20" Drill Press with hand feed, power feed or the new W-T Air Feed — in bench or floor models; you can set it up in any number of multiple spindles.

1100 Series — Walker-Turner "LIGHT-HEAVYWEIGHT" *20" Drill Press:* 6" spindle travel. 10 spline manganese steel spindle. Unusually wide range of speeds — 260 to 2600 rpm, with 1140 rpm motor. Capacity to 1" in cast iron.

Ask your Walker-Turner Distributor to show you what this husky drill press can do for you. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and we'll send full descriptions.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT — RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS — RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS — JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-Turner

WALKER-TURNER
INCORPORATED
Plainfield, N. J.

ALLOY WIRE *Cushions*...

take the *SHAKES* out of AIRCRAFT INSTRUMENTS

Fabricated all-metal mounts have high damping properties . . . Resist deterioration.

Robinson Aviation, Inc., Teterboro, New Jersey, uses knitted stainless steel and nickel alloy wire cushions in their new all-metal engineered mounting systems to control vibration and shock in airborne electronic equipment and instruments. Alloy wire resilient cushions have attained performance standards heretofore impossible with conventional rubber or synthetic materials.

When fabricated into a special pattern, the wire forms literally thousands of tiny interlocking springs. Their high damping characteristics and non-linear spring rate provide ample protection against dynamic overloads. Alloy wire resists deterioration by oil, water, ozone, bacteria, dust and extreme temperatures. Knitted alloy wire is used in hundreds of other industrial applications, such as filters, mist eliminators, electronic shielding. For further information send today for our Application Bulletin A-1.

ALLOY METAL WIRE DIVISION

HKP H. K. PORTER COMPANY, INC.
Prospect Park, Pennsylvania

NEW PRODUCTS and equipment

and a single, manually operated handwheel for length adjusments.

The line handles (cutting doubles) 943 pieces an hour when run-

ning 28-gage coiled steel and 825 pieces an hour when running 26-gage material. *Write*: Union Tool Corp., 811 N. Detroit St., Warsaw, Ind.

Multiple Drive System

The heart of this synchronized, variable-speed system is a power unit which interlocks motors.

Turning the control dial on the power unit varies the speed of every motor in the system equally and simultaneously. Alternating-current, squirrel-cage induction motors are connected to the power unit by 3-phase circuitry.

The power units carry connected loads of 1 to 50 hp. *Write*: U. S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54, Calif. *Phone*: Adams 3-3131

Powdered Metal

Compo E is a low-cost, general-purpose bearing material that can be fabricated into sintered structural parts. It is made of nearly equal parts of iron and bronze.

The material is well suited for uses where quiet operation is essential. It is being used in fan motors, air conditioning motors

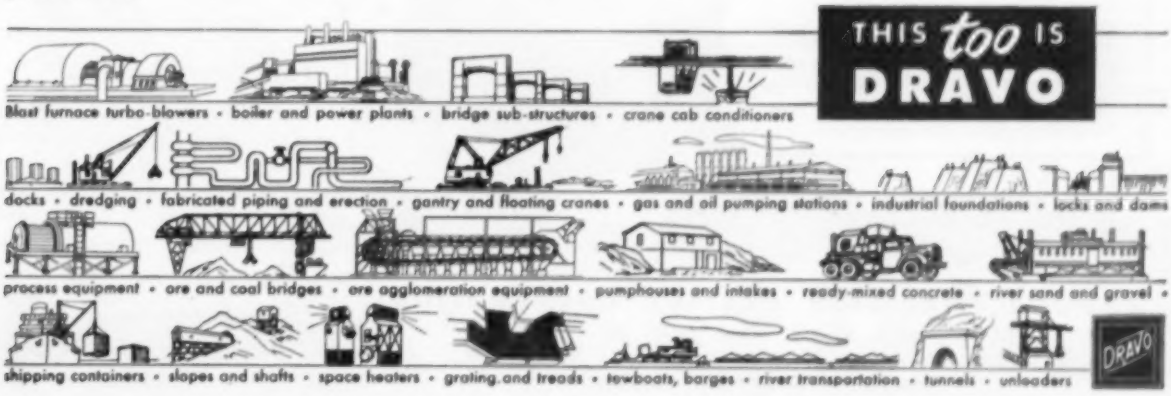
DRAVO EXTENDS WEIRTON STEEL'S DOCK AND HARBOR

Economy-minded business management is using river transportation to move increasingly larger tonnages of raw materials and finished goods. To realize the full potential savings, adequate docking and harbor facilities must be available to transfer cargoes with minimum delay.

When new warehousing and improved handling methods were bring planned by Weirton Steel Company, a division of National Steel Corporation, management took steps to provide sufficient dock space for increased river traffic. Dravo Corporation was asked to survey alternate dock sites and future expansion possibilities.

A solution resulting from the study was accepted and Dravo constructed 1800 feet of new harbor including 26 steel sheet pile cells. This cellular type of dock, pioneered by Dravo more than twenty years ago, is reasonable in cost, adaptable to expansion and requires little maintenance.

This is just one of many ways Dravo has been serving business and industry for more than 60 years. Dravo considers customer satisfaction an essential factor in all its products and services. DRAVO CORPORATION, PITTSBURGH 25, PENNA.


THIS too IS DRAVO
Blast furnace turbo-blowers • boiler and power plants • bridge sub-structures • crane cab conditioners
docks • dredging • fabricated piping and erection • gantry and floating cranes • gas and oil pumping stations • industrial foundations • locks and dams
process equipment • ore and coal bridges • ore agglomeration equipment • pumphouses and intakes • ready-mixed concrete • river sand and gravel •
shipping containers • slopes and shafts • space heaters • grating and treads • towboats, barges • river transportation • tunnels • unloaders
DRAVO

Your Engineer is Right!

Investment Casting permits new approaches to design and production engineering, unbound by the restrictions of traditional metallurgical practices and manufacturing techniques.

Major economies are obtained when your products or components are designed . . . or redesigned . . . with tolerance, surface and inspection criteria to conform with casting techniques. The resultant savings in final cost and production time, more than repay this small investment.

Your design engineer deserves and requires the great flexibility and latitude in design and production planning offered by Investment Casting. If application requirements demand that a part be of complex shape, intricate contours in a material that's difficult to form or machine, in short or long run quantities, Investment Casting may provide the economical answer.

CASE IN POINT!

Freedom of Design

The rudder over-balance eliminator used on the jet bomber is an investment casting of specification QQ-M-55 Magnesium, Alloy AZ-92. This intricate design is more economically produced by investment casting than any other process, permitting design freedom and assuring quality performance.

ARWOOD

ARWOOD PRECISION CASTING CORPORATION

327 W. 44th St. • New York 36, N. Y.

Plants: Brooklyn, N. Y. • Groton, Conn. • Tilton, N. H. • Los Angeles, Calif.

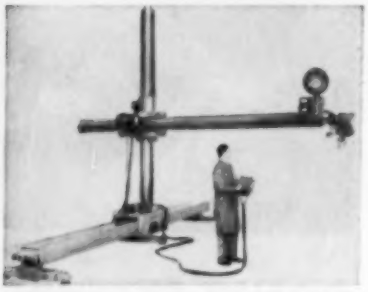
"PIONEERS IN INVESTMENT CASTING"

and drives, record players, tape recorders and home laundry equipment. *Write*: Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. *Phone*: Elliot 6-0441

Welding Head

This Universal, automatic manipulator fabricates large weldments.

The 18 x 12 x 12 ft track-type unit features simultaneous three-directional travel, infinitely variable welding speeds up to 72 ipm, 360-degree boom rotation and an adjustable track.



Any subarc or inert-gas welding head can be used. *Write*: Welding Division, Lewis Welding & Engineering Corp., 15 Interstate St., Bedford, O. *Phone*: Bedford 2-2500

Extrusion Press

An electrohydraulic control system is used on a 1250-to-1500-ton aluminum extrusion press. Demonstrations are given at the company's plant, Bellefonte, Pa. *Write*: Sutton Engineering Co., Pittsburgh, Pa. *Phone*: Grant 1-8077

Rotary Grinders

Series 3G air-operated grinders come in five models, with speeds of 7000 to 18,000 rpm. They weigh less than 3¾-lb, are 11¼-in. long and operate on 90 lb of air pressure. Wheel sizes range from 1½

Use WELDED STEEL for Greater Strength with Less Weight!

The 65-ton weldment above is the crown for a large press. This piece, and the parts and assemblies illustrated at the left, are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are YOU making full use of welded steel components in your products? In the design of almost any type of heavy machinery there are pieces and sub-assemblies that can be produced more economically in welded steel—and with the additional advantages of less weight, greater rigidity and predictability. When you consider weldments, think of Mahon . . . because, you will find the Mahon organization a unique source of supply for welded steel in any form . . . a source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill and advanced fabricating techniques are supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or, better still, have a Mahon sales-engineer call at your convenience.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON

Make high-strength aluminum castings without heat treatment!

Foundries without heat treating facilities are producing high-strength aluminum castings with Federated's Tenzaloy. Mechanical properties are equivalent or superior to the common heat-treated alloys, and impact strength is greater.

Tenzaloy, a product of Federated research, is a self-aging alloy of the aluminum-zinc-magnesium type. It reaches full strength after a few days aging at room temperature. No special casting precautions or facilities are required.

Tenzaloy castings have excellent machinability. They can be anodized to a superior white color. Tenzaloy is one of the few casting alloys that can be brazed at high temperature. It has corrosion resistance equal to or better than the aluminum-silicon alloys.

If your heat treating facilities are inadequate or too costly, or if you are paying for outside work, or if you are casting large and complex aluminum shapes which cannot be conveniently heat treated, call Federated for more information on modern Tenzaloy. Any of our 13 plants and 23 sales offices across the country is ready to help.

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
IN CANADA: FEDERATED METALS CANADA, LTD., TORONTO AND MONTREAL

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead and Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

NEW PRODUCTS and equipment

to 3 in. The exhaust deflector is adjustable through 360 degrees.

Besides grinding wheels, the tools can be used with mounted points, rotary files, steel cutters, soft felt and rubber polishers and wire wheels. *Write*: Thor Power Tool Co., Aurora, Ill. *Phone*: Aurora 2-7601

Lift Platform

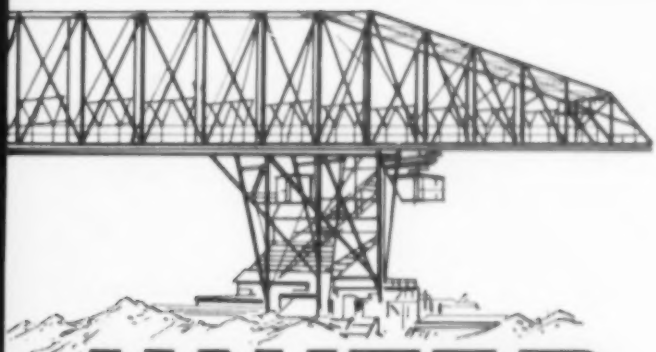
The Hi-Lift platform has a lifting height of 51½ to 70½-in. and a down height of 6½ or 10½-in. Capacity of the battery-powered hand truck is 4000 lb.

Platform width is 26 in.; lengths available are 36, 42, 48, 54 and 60 in. *Write*: Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Automatic Lapping

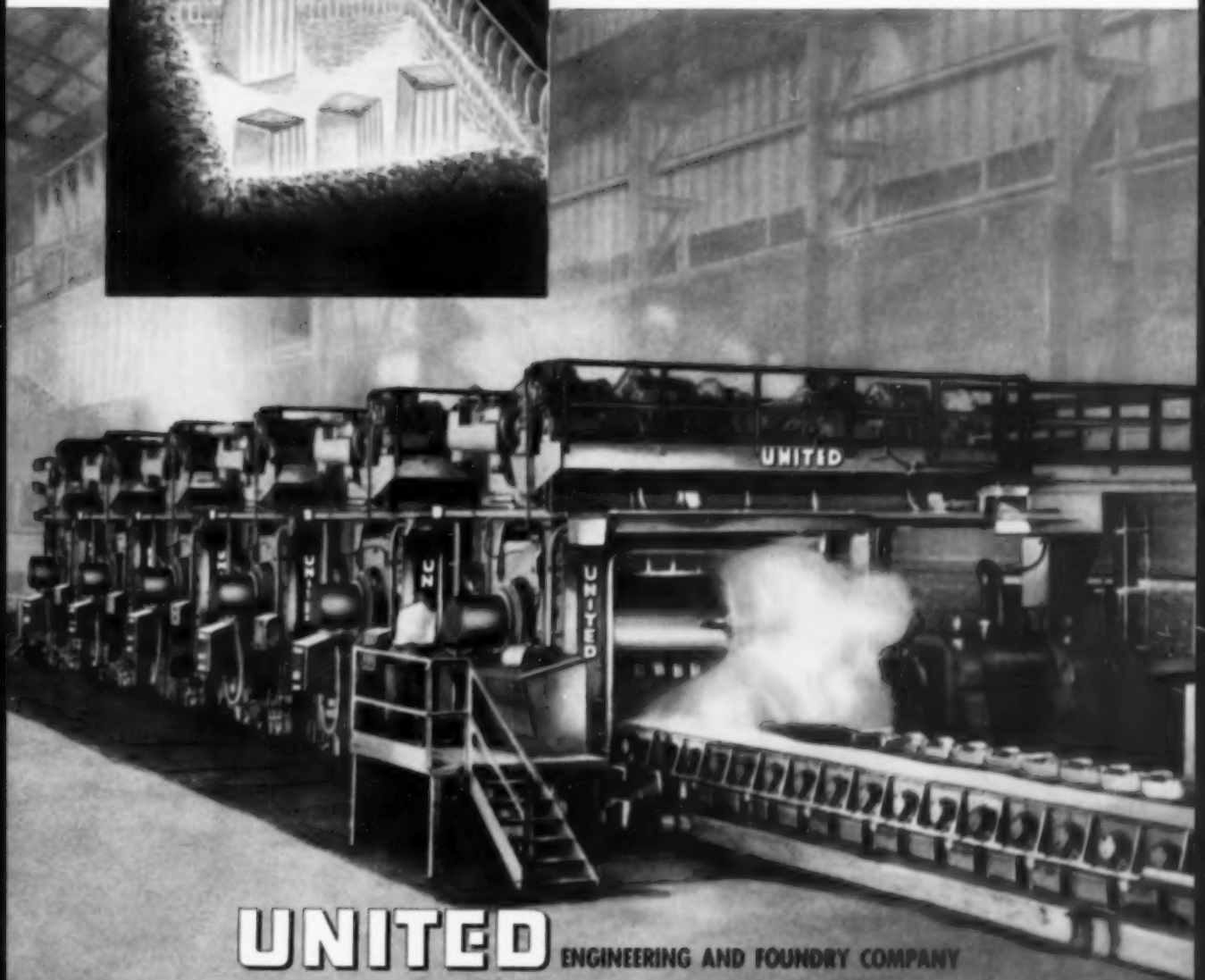
Here's a machine that center laps 300 pieces on both ends in 1 hr. Parts are lapped with coolant.

The machine uses two center-



UNITED®

6-STAND 4-HIGH HOT STRIP MILL



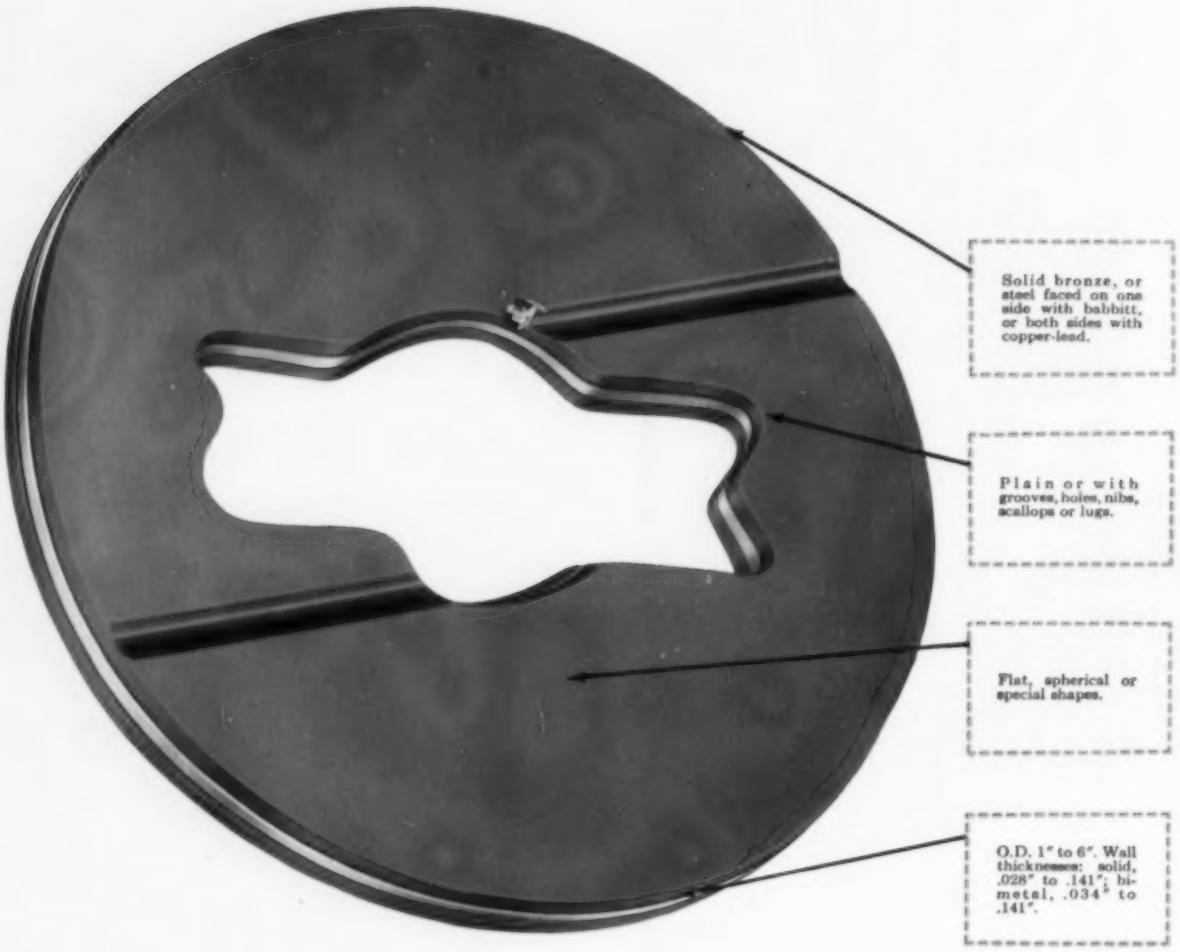
UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington (Labadell United Division)

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Malleable Iron and Steel Castings and Weldments.


Solid bronze, or steel faced on one side with babbitt, or both sides with copper-lead.
Plain or with grooves, holes, nibs, scallops or lugs.
Flat, spherical or special shapes.
O.D. 1" to 6". Wall thicknesses: solid, .028" to .141"; bi-metal, .034" to .141".

Washers can have Two Bearing Surfaces

Our cold-rolled thrust washers can be given two faces of sintered copper-lead to do double duty. They have exceptional hardness for heavy duty. Coining of special lubrication grooves avoids costly machining. We meet your specifications. Large capacity. Complete engineering service. Address:

FEDERAL-MOGUL

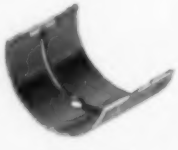
DIVISION, Federal-Mogul-Bower Bearings, Inc.

11051 Shoemaker, Detroit 13, Michigan

BABBITT-LINED BEARINGS

PLAIN & BIMETAL SPLIT BUSHINGS

SPACER TUBES



COPPER-LEAD BEARINGS

FEDERAL Mogul

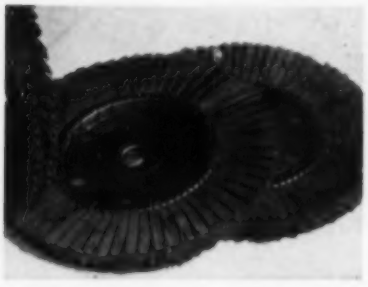
SINCE 1899

RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

lapping units. Each has an automatic dresser which dresses the stone after each cycle, or as needed, and resets itself to adjust for the amount of stone removed. Control panel lights flash and the machine shuts off when new stones are needed. *Write*: Industrial Metal Products Corp., Lansing, Mich. *Phone*: Ivanhoe 4-9411

Abrasive Buff

Ferrous and nonferrous metals can be handled with the sectional, impregnated abrasive buff.



It is made of specially treated biased cloth and is impregnated with selected abrasive grains.

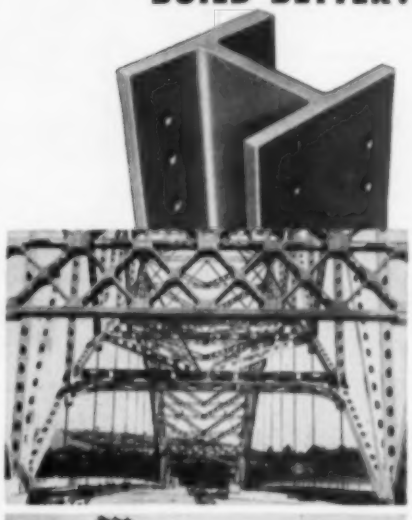
Spacers can be used to adjust cutting action and give greater coverage. *Write*: Carborundum Co., Niagara Falls, N. Y. *Phone*: 6631

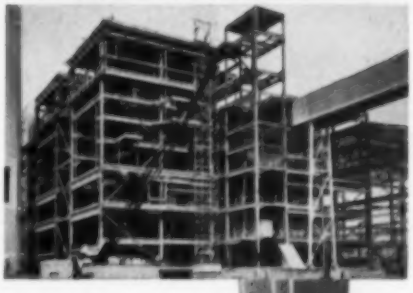
Industrial Truck

The 1½-ton capacity truck has a three-element hydraulic torque converter drive. A Wisconsin 15-hp, air-cooled engine powers the truck at a top speed of 12 mph.

Standard beds include an 18-cu-ft, bulk-handling bed and a 42 x 42-in. flat bed. *Write*: Prime-Mover Co., Muscatine, Iowa.

SPEED DELIVERY...
REDUCE COSTS...
BUILD BETTER...





"Steel permits streamlining construction with Safety, Endurance and Economy"

with

Fabricated Structural Steel

by

FORT PITT BRIDGE

When you want strength, endurance, versatility, economy and speed in *your* construction, specify and use Structural Steel fabricated by Fort Pitt Bridge—specialists in the engineering, fabrication and erection of all types of steel construction since 1896.

"There is no substitute for structural steel"

AISC

Fort Pitt BRIDGE WORKS

Member American Institute of Steel Construction

General Offices, PITTSBURGH, PA. • *Plant at* CANONSBURG, PA.

District Offices:
NEW YORK, N. Y. • CLEVELAND, OHIO • DETROIT, MICHIGAN

HAVE YOU TRIED THIS EXTRAORDINARY CLEANER?

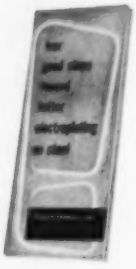
Oakite Rustripper removes rust and heat scale in the same operation that removes oil. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

Have you taken the four good steps?

How can cleaning costs be reduced 33% while cleaning quality is being improved? *See pages 7 and 8 of booklet.*

What are four easy ways to improve the average rinse tank? *See page 10.*

What causes hydrogen embrittlement during electrocleaning? What is the remedy? *See pages 15 and 16.*



Do you need a brass cleaner that gives better protection against tarnishing?

Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current.

"It cut our cleaning rejects by more than 90%"

says a manufacturer who found that Oakite Composition No. 95 gave him:

BRIGHTER PLATING—All films removed . . . no residues, no undersurface shadows, no anodic blackening, nothing to impair the brightness of the electroplate.

FEWER REJECTS—Major causes of blistering and peeling eliminated . . . Consistent success in baking for 60 minutes at 300°F.

OAKITE PRODUCTS, INC.
34E Rector Street, New York 6, N. Y.

Send me the FREE booklets indicated below:

- ☐ Here's the best shortcut in the field of electroplating
- ☐ Four good steps toward better electroplating on steel
- ☐ What's NEW for electrocleaning brass and other copper alloys
- ☐ Good news about electrocleaning zinc-base die castings

NAME _____

COMPANY _____

ADDRESS _____

FREE
For further information, ask for booklet

OAKITE

Technical Service Representatives in Principal Cities of U.S. and Canada

NEW literature

Write directly to the company for a copy

Shell Molding

Silicones used as release agents in shell mold manufacture are covered in an 8-page booklet. Silicones Division, Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Cap Screws

A 4-page bulletin discusses a cold-forming, double-extrusion process and how it is suited for the making of cap screws, special threaded parts and other shapes. Box 579, Cleveland Cap Screw Co., 2917 E. 79th St., Cleveland 4, O.

Electric Motors

Split capacitor, fractional horsepower motors, blowers and special products are described in a 12-page bulletin. Redmond Co. Inc., Owosso, Mich.

Roller Bearings

A 72-page catalog specifies Shafer self-aligning roller bearings. Shaft sizes range from ¾ to 7 in. Chain Belt Co., Milwaukee 1, Wis.

Metal Fabrication

A booklet describes small metal stampings and assemblies and gives case histories of redesigned components. Risdon Mfg. Co., 10 Risdon St., Naugatuck, Conn.

Stainless Steel

Properties, uses and advantages of type-430, nickel-free, stainless-steel sheet are given in a 16-page booklet. Washington Steel Corp., Washington, Pa.

Reciprocating Compressors

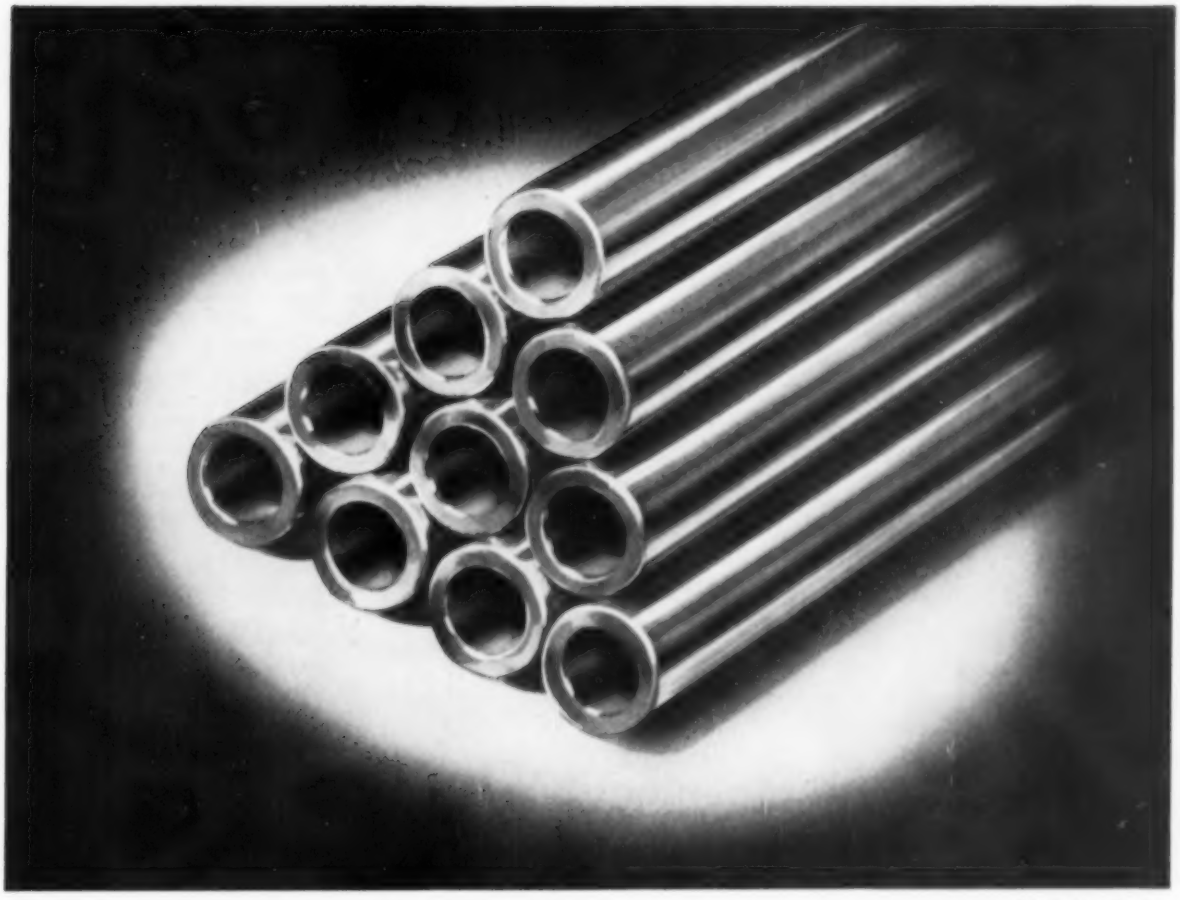
Bulletin F-80 describes compressors with single or twin frames and single or multistage cylinders in ratings up to 600 hp. Cooper-Bessemer Corp., Mt. Vernon, O.

Folders and Brakes

Bulletin 74C, 8 pages, presents a line of adjustable bar folders and foot brakes which will handle any width. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Magnetic Materials

A 32-page bulletin gives information on magnetic core materials, silicon steels, oriented silicon steel and



Typical Bishop Tubing

Look No Further...For QUALITY

Bishop small diameter stainless steel tubing is not surpassed in meeting corrosion, heat, shock, stress and vibration.

It is not excelled in quality of starting stock . . . in accuracy of I.D. and O.D. . . . in dimensional precision . . . in finish.

When quality is of prime importance for hydraulic lines, for aircraft parts, for instruments, for electronics . . . in fact wherever high quality steel tubing is indicated, look to Bishop for the finest . . . at comparable prices.

Platinum and Platinum Group Metals
Stainless Steel Tubing
Tubular Fabricated Parts
Spinnerettes
Hypodermic Needles and Syringes

CAPILLARY, MECHANICAL, HYPODERMIC & AIRCRAFT

Stainless Steel Tubing—seamless and welded and drawn (.008" to 1.000" O.D.)

Nickel and Nickel Alloy Tubing (up to .625" O.D.)

Bent, Flanged, Flared, Milled, Slotted, Swaged, Threaded, etc.

Illustrated Catalog and Prompt Quotations on request

J. BISHOP & CO. Platinum Works • Established 1842

Stainless Steel Products Division, Malvern, Pa.

STOP...

Metal cleaning can be Automated, too!

Don't pyramid your production costs by using hand-operated metal cleaning methods. Detrex cleaning equipment can be built right into your automated line, thus eliminating slow and costly manual labor. In fact, Detrex has been building automated degreasers and washers for years.

Keep your metal cleaning processes in step with the rest of your production. Rely on Detrex quality and experience to maintain the pace. Mail the coupon for complete information on Detrex equipment or check your Sweet's Plant Engineering File.

☐ I am interested in automating my ___degreasing ___washing operation.

☐ Please send literature on standard Detrex equipment.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

DETREX CORPORATION Dept. A-201

BOX 501, DETROIT 32, MICH.

DEGREASERS • DEGREASING SOLVENTS • WASHERS • ALKALI AND EMULSION CLEANERS • PHOSPHATE COATING PROCESSES

NEW LITERATURE

permanent magnet materials. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Gear Shaving

Machines for rotary shaving of external or internal spur and helical gears are depicted in bulletin S-56-1, 12 pages. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

Automation

Catalog D-31, 20 pages, describes differential transducer control, automation systems, a complete line of time control equipment and valves, counters and electronic contactors. Advertising Manager, Automatic Temperature Control Co. Inc., 5200 Pulaski Ave., Philadelphia 44, Pa.

Spectrochemical Analysis

Bulletin V2-56, 8 pages, describes an excitation unit for spectrochemical analysis. Jarrell-Ash Co., 26 Farwell St., Newtonville, Mass.

Measuring Equipment

Catalog GEC-1016, 40 pages, presents 80 testing instruments, from thickness gages to a mass spectrometer leak detector. General Electric Co., Schenectady 5, N. Y.

Molybdenum Carbides

Bulletin Cdb, 6 pages, summarizes the uses, properties and preparation of molybdenum carbides and nitrides. Department L, Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Curtain Walls

Steel panels and joists that can be used for 30-ft spans are covered in a 24-page bulletin. Stran-Steel Corp., Ecorse, Detroit 29, Mich.

Surface Grinder

An 8-page catalog tells of a hand-feed precision grinder for big toolroom jobs. Abrasive Machine Tool Co., East Providence, R. I.

Grinding Wheels

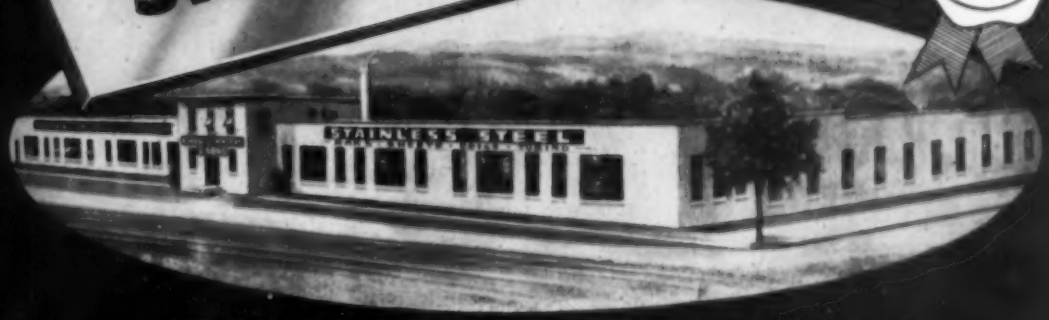
Maximum operating speeds of mounted wheels and other data are given in a 26-page booklet. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, O.

Pipe and Tubing

Bulletin TDC-163A, 6 pages, presents condensed technical data on tubular products used at high tem-

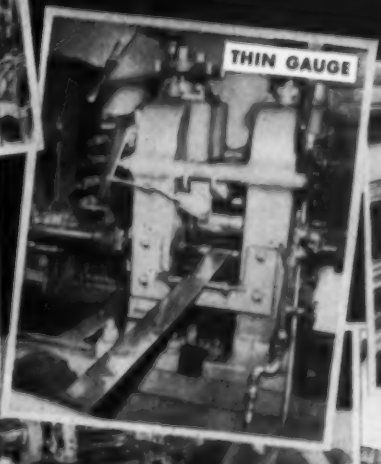
ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.



COMPLETELY EQUIPPED CONVERTING WAREHOUSE

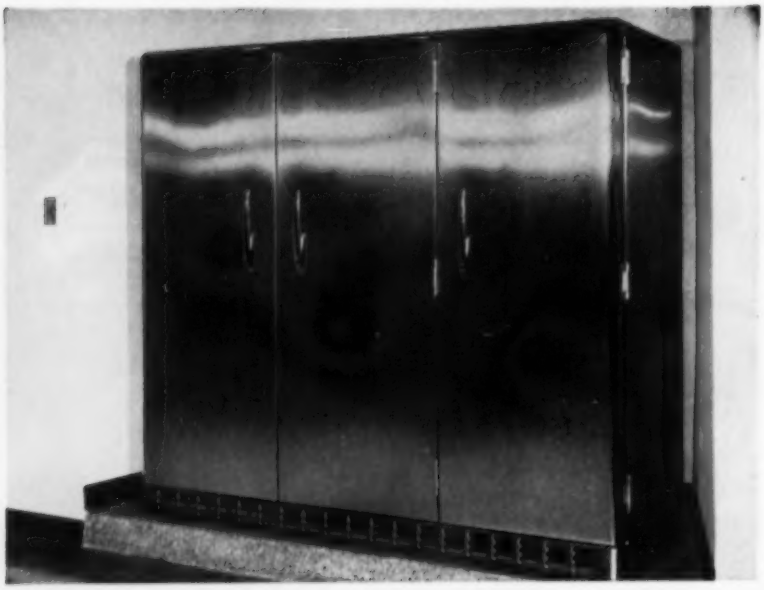
STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
Inquiries for small lots welcomed.



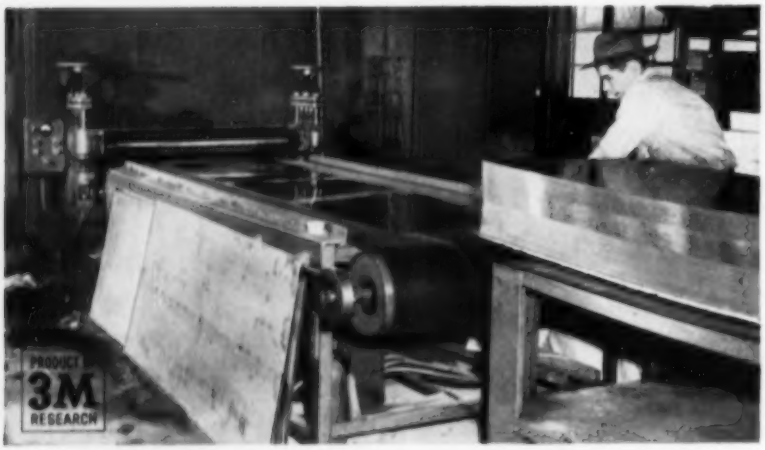
ULBRICH Stainless Steels

WALLINGFORD, CONN.

Phone: COlony 9-7771

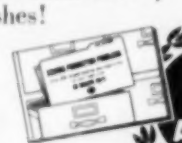


PROBLEM Victory Metal Mfg. Corp., maker of commercial refrigerators, uses coated abrasive belts to surface-polish 18-8 stainless steel sheet stock from its standard 2B mill finish to a #4 finish. With Brand "X" Belts, costs per polished sheet were high.



ANSWER A 3M Representative suggested that this Plymouth Meeting, Pa., firm switch to 3M Abrasive Belts — Grit #80 Three-M-ite Cloth for rough grinding, Grit #150 Tri-M-ite Resinite Cloth for polishing. Cost per sheet for polishing operations immediately dropped substantially, with superior finishes!

Your 3M Representative can help *you* cut costs and increase production, too. Call him today. Or write Minnesota Mining and Manufacturing Co., Dept. **GJ-56,** St. Paul 6, Minn., for FREE booklet: "Case History Reports on 3M Abrasive Belts".



3M® ABRASIVES

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip surfacing.

NEW LITERATURE

peratures. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Wire Rope

Recommendations for the use of wire rope include data on diameters, construction, preforming, lay, grade and core — bulletin DH-1280, 24 pages. American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

Press Brake

A 4-page bulletin, 131-56, gives specifications of an 11-ton-capacity press brake. Dreis & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill.

Spot Welder

Bulletin 335-1, 8 pages, describes a spot welder and a projection welder which are air-operated, 3-phase units. Department L-8, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill.

Industrial Floors

Corrosion-resistant floors are described in bulletin 3-3. Atlas Mineral Products Co., Mertztown, Pa.

Welding

Simplified welding procedures for every base metal are included in a 140-page pocket data book, TIS 2575. Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y.

Guide Pins

A 36-page bulletin lists guide pins, guide pin bushings and accessories for die sets. Lamina Dies & Tools Inc., 14925 W. 11 Mile Rd., Oak Park, Mich.

Alloys for Electronics

Bulletin 7 gives data on thin-gage beryllium copper, phosphor bronze, nickel silver, chromium copper, stainless 17-7PH, Invar and magnetic strip down to 0.0005-in. thick. Penn Precision Products Inc., 501 Crescent Ave., Reading, Pa.

FILMS AVAILABLE

"Men Who Make Steel" shows the knowledge and skill needed in steelmaking. The 28-minute color movie was filmed in Republic Steel Corp.'s mills, mines and plants. It is distributed by Modern Talking Picture Services Inc., 1008 Superior Ave., Cleveland, O.

CYLINDER TUBING

..."mirror-finished" by Standard

Standard "mirror-finished" cylinder tubing is full-finished to use without further sizing or finishing for such applications as *automobile shock absorbers, power steering* and *hydraulic pumps.* When it comes to punishment, it can really take it. Every inch of this rugged tubing measures up to exacting specifications in cylinder finish . . . in ID tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, *tested to shocks up to 9000 p.s.i.* Cylinder sizes to 3" OD x .165" wall. For full information on Standard's complete range of products, plant facilities and engineering assistance send for *free* folder below.

- **Welded Stainless Tubing and Pipe.**
- **Welded Carbon Steel mechanical.**
- **Boiler and Heat Exchanger.**
- **Exclusive rigidized pattern.**
- **Special Shapes**

Shock absorber with metal-to-metal plunger in cylinder tube held to .001" ID tolerance. "Mirror-finish", concentricity and precision tolerance makes Standard cylinder-grade tubing usable *as is* for hydraulic and other cylinders.

Free 8-page folder on all Standard products. Write to address below.

STANDARD

THE STANDARD TUBE COMPANY

24400 PLYMOUTH ROAD • DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger • Exclusive rigidized patterns • Special Shapes • Steel Tubing—Sizes: ⅛" OD to 5½" OD —.028 to .260 wall • Stainless—Sizes: ⅛" OD to 4" OD—.020 to .154 wall.

Cleveland Drum Type Clutch
speeds die adjustment . . . cuts production costs

These Cleveland Two-Point Presses equipped with patented Cleveland Drum Type Friction Clutch have done just that. You'll find that even the largest Cleveland Press equipped with a Cleveland Clutch is as easy to control as the smallest inclinable.

Press slide can be exactly "inched" for faster die adjustment or can be operated on a single stroke or continuous cycle with instantaneous starting and stopping. Operators have positive control at all times. Increased slide control extends die life . . . reduces stamping rejects.

Designed with a minimum number of moving parts, there's less chance of failure with a Cleveland Clutch. When necessary, adjustments can be made right on the press. Light-weight construction reduces horsepower required for operation. Spring-loaded brake stops slide immediately in event of electric or air supply failure. To prevent die damage, clutch can be set to slip under overload.

Install Cleveland Clutches on your older press equipment regardless of make or model. You'll get increased efficiency for lower production costs. Write or call today.

Eleven types of Cleveland Presses assure unbiased recommendation.

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES – FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio

Offices at: NEW YORK • CHICAGO • DETROIT
PHILADELPHIA • E. LANSING

CITY FOUNDRY DIVISION · SMALL TOOL DEPARTMENT

STEEL

May 14, 1956

Market Outlook

STEEL COMPANY order books for the third quarter are filling more slowly than they have in any quarter in the last year and a half. But the situation isn't hard to explain.

Everyone expects a substantial, across-the-board increase in steel prices in the third quarter. Buyers are asking: Why be in a rush to buy when prices will be up?

Steel consumption normally declines during this vacation and hot weather period. So why be in a hurry to order steel during a time of reduced consumption?

Consumers have, where possible, been laying in inventory as a hedge against a steel price increase and the possibility of a steelworkers' strike in the third quarter. Again, why be in a rush to order steel then?

A SURE THING—If there isn't a steelworkers' strike, steel production still will be down in the third quarter because of reduced demand and the effects of vacations and hot weather in the mills.

The automobile industry would be the biggest consumer to sit out the third quarter. It has been laying in substantial quantities of steel.

CONTRASTS—Although some consumers can feel independent about third quarter orders; others, including the users of plates, structural shapes and seamless pipe and tubing, must place all they can. It has been impossible to build inventories of these products, and there is no sign of a letup in the need for them.

A LIMIT—Where possible, steel producers may divert ingot tonnage from some of the more plentiful products to those in short supply. But diversion can go only so far. Some producers don't make a full line of products, and there's a limit to how much a mill can roll. When, for instance, a structural mill is rolling at capacity, it makes no difference how much more steel is available to it. It can roll only to its limit.

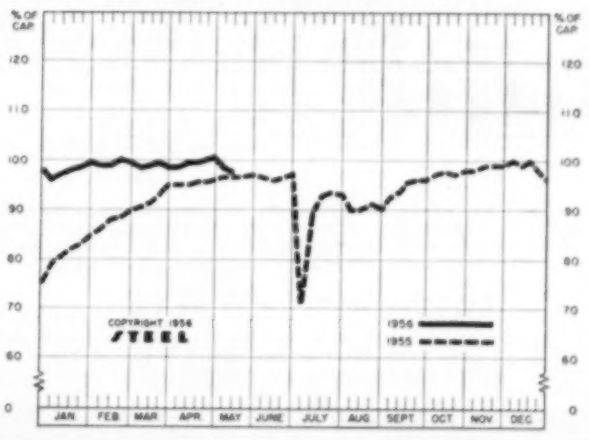
On the steel products in freest supply, mills will go into the third quarter with the smallest order carry-over they've had for more than a year.

UNPERTURBED—Steel producers see no cause for alarm. Even if their ingot operations decline in the third quarter, their last half could be a good one, for the fourth quarter is expected to be better than the third. C. M. White, president, Republic Steel Corp., told stockholders high operations should continue into the first quarter of 1957.

PRODUCTION PROBLEMS—Mills in the U. S. are working as hard as they can to turn out steel. They are handicapped by the necessity to repair furnaces that have been pushed to capacity and by labor difficulties. A combination of these in the week ended May 13 cut ingot output to 97.5 per cent of capacity. This is a 1-point reduction from the preceding week.

SCRAP BREAK—Scrap prices continued to back away from record levels. The adjustment is attributed to fear of a steelworkers' strike and mill reluctance to pay high prices. In coastal areas, export trading is supporting the market to some extent on the major open-hearth grades of scrap. The downtrend is reflected in STEEL's price composite on steelmaking scrap. At $53.00 a gross ton, it's down $2.00 from the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended May 13	Change	Same Week 1955	Same Week 1954
Pittsburgh	101.5	+ 1*	99	71
Chicago	100	+ 2*	100.5	83
Mid-Atlantic	99	0*	98.5	86
Youngstown	98	+ 1	98	68
Wheeling	101	— 2	95.5	84
Cleveland	95.5	+ 2.5*	102	78.5
Buffalo	105	0	104.5	67.5
Birmingham	23.5	0	93.5	56.5
New England	89	+ 1	88	50
Cincinnati	93	0	89.5	59.5
St. Louis	96.5	+ 2.5	106	72.5
Detroit	97	— 2.5	91.5	64.5
Western	109	0	100	56
National Rate	97.5	— 1	96.5	68

INGOT PRODUCTION‡

	Week Ended May 13	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.8†	147.7	154.6	146
NET TONS (In thousands)	2,375†	2,373	2,483	2,345

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 61

Technical Outlook—p. 117

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	May 8 1956	May 1 1956	Month Ago	Apr. Average
(1947-1949=100)	158.0	158.0	157.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 8

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	6.243
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.097
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	170.036
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	252.243
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	41.017
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	21.360
Bars, H.R., Alloy	9.425	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	9.333
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb	8.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	7.133
Bars, C.F., Carbon	8.800	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.275	Wire, Drawn, Stainless 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	6.895
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	May 9 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	210.45	210.45	209.10	194.53	171.92
Index in cents per lb	5.701	5.701	5.665	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.98	$128.98	$128.02	$118.45	$106.32
No. 2 Fdry Pig Iron, GT	60.27	60.27	60.27	56.54	52.54
Basic Pig Iron, GT	59.80	59.80	59.80	56.04	52.16
Malleable Pig Iron, GT	61.27	61.27	61.27	57.27	53.27
Steelmaking Scrap, GT	53.00	55.00	55.00	34.83	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 9 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.55	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.53	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Contesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	5.35	5.35	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.45	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, ½-⅝" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$61.00	$61.00	$61.00	$57.00	$53.00
Basic Valley	60.00	60.00	60.00	56.00	52.00
Basic, deld. Phila.	63.76	63.76	63.76	59.66	56.49
No. 2 Fdry, Pitts.	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, deld. Phila.	64.26	64.26	64.26	55.16	56.99
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.33
Malleable, Valley	60.50	60.50	60.50	56.50	52.50
Malleable, Chicago	60.50	60.50	60.50	56.50	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$51.50	$53.50	$54.50	$34.50	$45.00
No. 1 Heavy Melt, E. Pa.	56.00	57.00	56.00	36.00	43.50
No. 1 Heavy Melt, Chicago	51.50	54.50	54.50	34.00	43.50
No. 1 Heavy Melt, Valley	57.50	57.50	58.50	34.50	45.00
No. 1 Heavy Melt, Cleve.	54.50	54.50	57.50	31.50	44.00
No. 1 Heavy Melt, Buffalo	53.50	55.50	55.50	39.50	44.00
Rails, Rerolling, Chicago	72.50	72.50	72.50	52.50	52.50
No. 1 Cast, Chicago	52.50	52.50	51.50	40.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

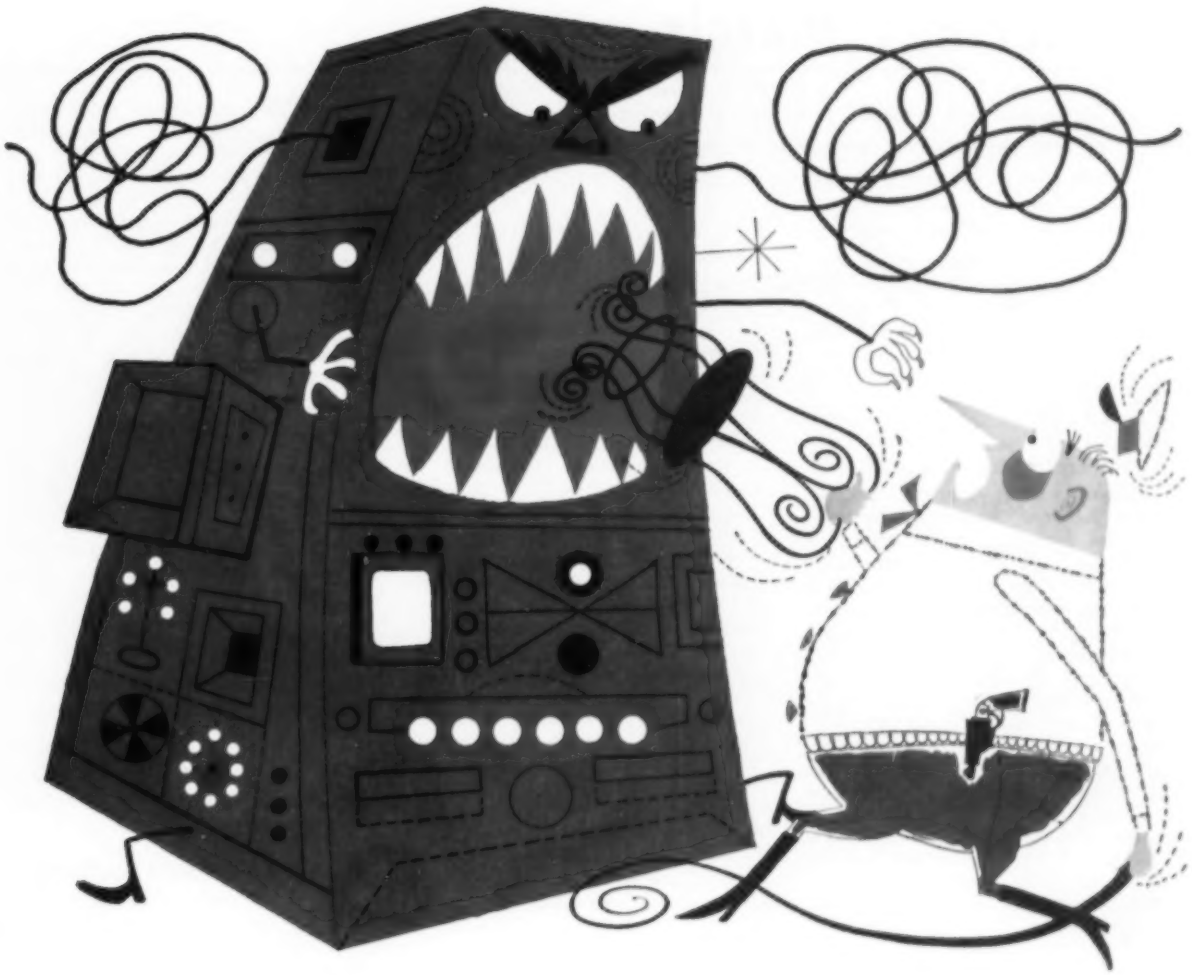
Daily Nonferrous Price Record

	May 9 Price	Last Change	Previous Price	Apr. Avg.	Mar. Avg.	May 1955 Avg.
Copper	45.00-46.00	May 2, 1956	45.50-46.00	47.500	49.727	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.500
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.500	12.000
Tin	98.375	May 9, 1956	98.125	99.270	100.606	91.410
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	24.650	23.200	
Magnesium	33.75	Apr. 16, 1956	32.500	33.150	32.500	28.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



Taming a wire fabricating machine?

Call American Steel & Wire!

Wire machines can be ornery. They seem to have a brain that delights in fouling up a high speed production line.

Very frequently, your American Steel & Wire representative can tame things down. With over a century of company experience behind him, he may be able to suggest a minor change in wire specifications, die construction or fabricating procedure that will solve the problem.

At AS&W, we *use* a lot of wire in our own plants, and have learned a lot of little tricks that are yours for the asking. Just call your American Steel & Wire representative.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, O.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN MANUFACTURERS WIRE

USS

AMERFINE—*high quality fine wire.*
AMERSPRING—*music steel spring wire.*
AMERTEMP—*heavy-duty oil-tempered wire.*
AMERLOY—*alloy heading wire.*
AMERHEAD—*uniform heading wire.*
AMERSTITCH—*extra-tough metal stitching wire.*

UNITED STATES STEEL

Nonferrous Metals

Congressional interest in nickel grows as various segments of industry become more intent on getting additional quantities of it. Nicaro may be up for sale in fall

Nonferrous Metal Prices, Pages 198 & 199

SEVERAL congressmen are asking: "Why can't businessmen in my community get enough nickel?" Rep. John W. McCormack (Dem., Mass.) has received correspondence from Defense Mobilization Director Arthur S. Flemming on the matter.

While much of the letter was the normal government line, there were several significant points.

Expensive Stuff—Mr. Flemming reports that the Business & Defense Services Administration estimates that about 4 million lb of gray-market nickel selling at $2.50 to $3.50 a pound came from these sources: France, 1.2 million lb; Japan, 70,000 lb; Germany, 152,000 to 200,000 lb; recovery of secondary nickel, balance.

With regard to the Townsend report on nickel, Mr. Flemming commented: "The report was prepared for use in reaching decisions in the executive branch on future actions and programs. It involves data of highly classified nature." He did admit the report recommends that the U. S. pursue a "vigorous policy of encouraging and, if necessary, assisting private industry to expand sources of supply."

Conclusion — Said Dr. Flemming: "We feel that the only way to provide a fundamental solution to the problem is to do everything we can to accelerate and bring in additional production. Within a few weeks we intend to announce a program designed to provide incentives for achieving expansion additional to that already under way."

Look for the General Services Administration to stir interest by putting the U. S. Nicaro project on the market. This cannot take place until fall because no one will submit an offer until Nicaro's expanded facilities have been proved and production schedules are being met. With proper government incentives, Freeport Sulphur Co., Bethlehem Steel Co. and National Lead Co. could become primary nickel producers.

Zinc: Future Bright

Zinc producers are forgetting that motordom is not having a spring rush. They are talking about the orders they think Detroit will place when the '57 models bow in. "In the meantime," says one producer, "we are getting our stock levels back to normal."

Statistics from the American Zinc Institute for April confirm this statement. While stock levels rose from 40,038 tons on Apr. 1, to 47,907 tons on the last day of the month, only 4570 tons were sold to GSA for U. S. stockpile. April production totaled 88,664 tons. Shipments: 80,795 tons.

Copper Prices Level

The London Metal Exchange price for copper continues to hover near 43 cents a pound. Users are still taking all they can get for June. But custom smelters, who are holding the line at 45 cents a pound, are finding few customers.

There is a growing feeling that the "big drop" is over until labor negotiations are settled in June. Users will be reluctant to let stock levels dip with the possibility of a strike in the offing.

Outlook: LME prices will vacillate from day to day, but there should be no marked downward trend in prices for the next month.

More Zirconium Coming

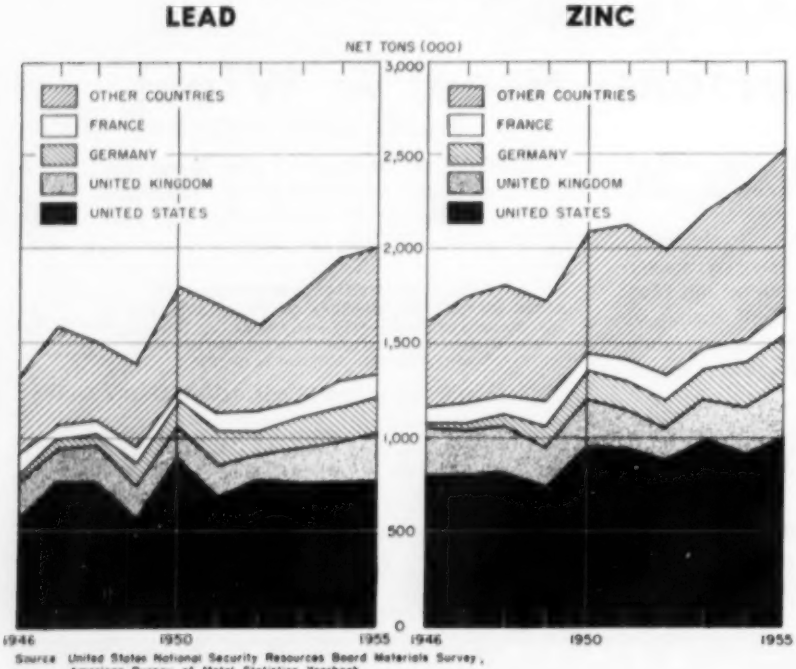
U. S. Industrial Chemicals Co. predicts that by July, 1957, its price for reactor grade zirconium sponge will be $7 a pound to commercial users. This compares with a current price of about $14 a pound. Reason: The company is building a new 1.5-million-lb-per-year plant which will be in production by the middle of 1957. A new process will lower production costs.

For nonnuclear uses, say company officials, hafnium does not have to be removed from zirconium. Commercial grades of this type can be sold for as low as $3.50 a pound when and if sufficient volume is reached, explains USI. The current price is about $10 a pound.

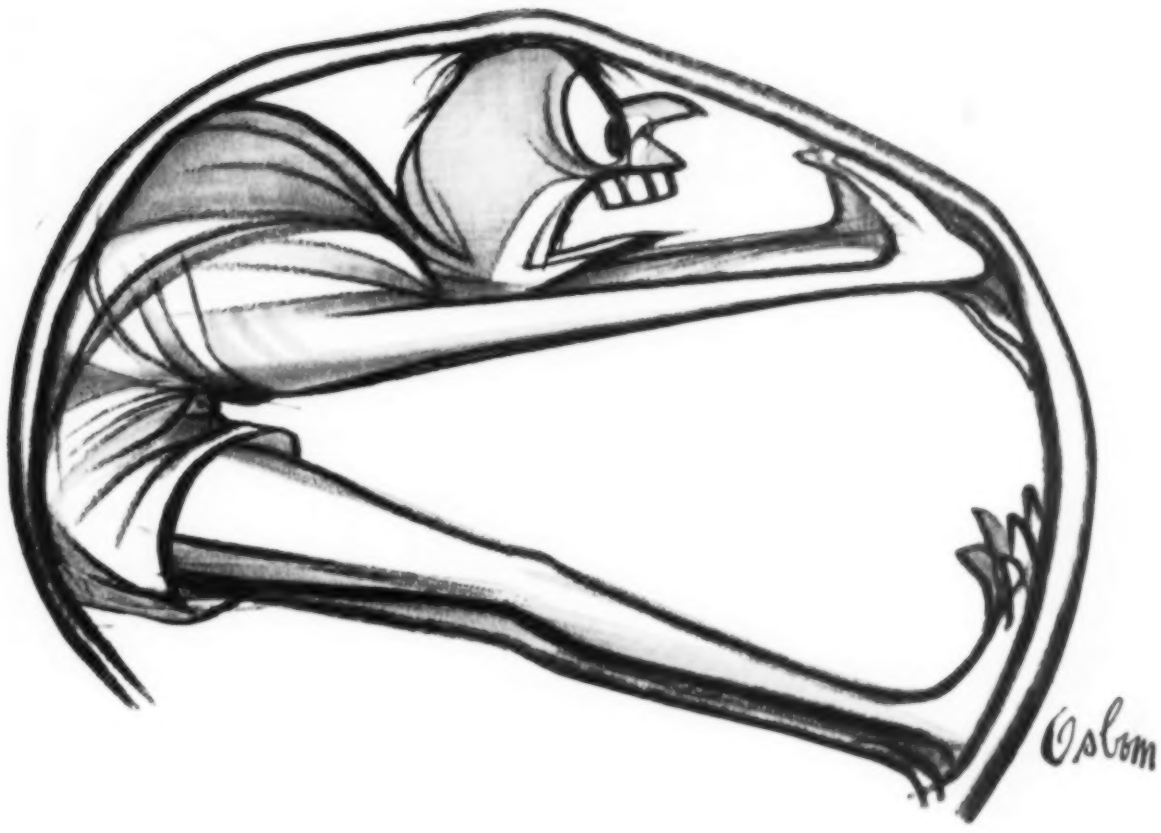
Aluminum's Daily Routine

Aluminum ingot sales continue at record-breaking peaks. There is some indication that aluminum fabricators that serve the auto industry are cutting back production. Producers of aluminum pistons and auto trim are feeling the effects of automotive cutbacks. But no one is worried. Says one industry observer: "Expansion announcements from aluminum companies are becoming the order of the day. It seems like one of us makes an announcement every ten days."

CONSUMPTION OF PRIMARY



Source: United States National Security Resources Board Materials Survey, American Bureau of Metal Statistics Yearbook



STRESS

can be a hidden enemy of circular parts like jet-engine rings. To insure physical and metallurgical accuracy, specify Cleve-Weld welded rings.

Top Jet-Engine makers specify Cleve-Weld rings

The *design, metallurgy* and *production* of welded circular parts have been Cleve-Weld specialties for 45 years. We've worked with materials from carbon to stainless and the latest aircraft alloy steels. Cleve-Weld has the specialized equipment and experience to do exacting jobs. These are the reasons why America's jet-engine makers procure Cleve-Weld rings. Pratt & Whitney J-57, Wright Aeronautical J-65, General Electric J-47 and other great jet engines testify to our ring accuracy.

Cleve-Weld is also a prime supplier of truck and tractor rims, rings, bands and gear blanks. *Make Cleve-Weld your primary source for all rolled and welded circular parts, too.* We'll show you why in dollars and cents. Write Circular Welded Products Sales Department below.

THIS IS THE BASIC CLEVE-WELD PROCESS. Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS

Another AMF Product

CLEVE-WELD PROCESS
RIMS · RINGS · WELDMENTS

CLEVELAND WELDING DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 7, Ohio

SEND THIS COUPON NOW

Cleveland Welding Division
American Machine & Foundry Company
West 117th Street and Berea Road
Cleveland 7, Ohio

Please send me:

- ☐ Truck Rim Catalog
- ☐ Tractor Rim Catalog
- ☐ Brochure on Cleve-Weld Process

Name_____

Title_____

Attach to your company letterhead and mail

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.10; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 46.00 deld. Conn. Valley; 46.00 deld. Midwest; custom smelter, 45.00 deld.; Lake, 46.00 deld.; Fire refined, 45.75 deld.; Chilean electrolytic, 42.03 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $268-$271 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz nom.

Palladium: $23-$24 per troy oz.

Platinum: $97-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, e.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 98.375; prompt, 97.50.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld.

Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-28.00; No. 12 foundry alloy (No. 2 grade), 26.25-27.00; 5% silicon alloy, 0.60 Cu max, 27.25-29.25; 13 alloy, 0.60 Cu max, 27.25-29.25; 195 alloy, 27.75-29.25; 108 alloy, 26.00-27.50. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 26.00-27.50; grade 2, 25.25-26.75; grade 3, 24.50-26.00; grade 4, 24.00-25.50.

Brass Ingot: Red brass, No. 115, 40.50; tin bronze, No. 225, 53.50; No. 245, 46.75; high-leaded tin bronze, No. 305, 43.75; No. 1 yellow, No. 405, 31.75; manganese bronze, No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.355; l.c.l., 51.98. Weatherproof, 30,000-lb lots, 48.28; l.c.l., 49.03. Magnet wire deld., 15,000 lb or more, 58.68; l.c.l., 59.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	69.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheet and Circle: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.0

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
⅜	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.05	6	266.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 100.00; .081 in., 75.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (F8)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 15.50-16.00; old sheets, 14.00-14.50; borings and turnings 9.00-9.50; crankcases, 15.00-15.50; industrial castings, 14.50-15.00.

Copper and Brass: No. 1 heavy copper and wire, 34.00-34.50; No. 2 heavy copper and wire, 32.00-32.50; light copper, 29.50-30.00; No. 1 composition red brass, 27.50-28.00; No. 1 composition turnings, 26.50-27.00; yellow brass

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	68.62b	65.86c	....	68.82	43.500	43.500	42.750
Yellow Brass	56.50	46.58d	57.14	59.51	32.250	32.000	29.875
Low Brass, 80%	61.35	61.29	61.89	64.16	36.625	36.375	35.875
Red Brass, 85%	63.07	63.01	63.61	65.88	38.250	38.000	37.500
Com. Bronze, 90%	65.33	65.27	65.87	67.89	39.875	39.625	39.125
Manganese Bronze	63.54-63.66	57.52-57.64	67.99	....	30.250	30.000	29.500
Muntz Metal	57.84	53.65	....	....	30.125	29.875	29.375
Naval Brass	59.60-59.80	54.11	66.86	62.96	29.875	29.625	29.125
Silicon Bronze	71.92	71.11	71.96	74.13e	42.250	42.000	41.250
Nickel Silver, 10%	70.17	72.41g	72.41	....	35.625	35.375	17.813
Phos. Bronze, A, 5%	86.79	87.29	87.29	88.47	44.000	43.750	42.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. Based on copper at 47.5 cents a pound. g. Leaded

turnings, 17.00-18.00; new brass clippings, 24.00-24.50; light brass, 16.00-16.50; heavy yellow brass, 18.50-19.00; new brass rod ends, 23.00-23.50; auto radiators, unsweated, 19.00-19.50; cocks and faucets, 21.00-21.50; brass pipe, 21.00-21.50.

Lead: Heavy, 12.50-13.00; battery plates, 6.50-7.25; linotype and stereotype, 14.00-15.50; electrotype, 13.00-13.75; mixed babbitt, 15.50.

Monel: Clippings, 65.00-90.00; old sheets, 65.00-80.00; turnings 65.00-70.00; rods, 65.00-90.00.

Nickel: Sheets and clips, 100.00-200.00; rolled anodes, 100.00-200.00; turnings, 85.00-185.00; rod ends, 100.00-200.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.50; old die-cast scrap, 3.00.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.75-20.00; 3003 clippings, 18.50-20.00; 6151 clippings, 18.50-20.00; 5052 clippings, 18.50-20.00; 2014 clippings, 18.50; 2017 clippings, 18.50; 2024 clippings, 18.50; mixed clippings, 18.00-18.50; old sheet, 16.50; old cast, 16.50; clean old cable (free of steel), 16.50-18.25; borings and turnings, 15.50-17.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.

Copper and Brass: No. 1 heavy copper and wire, 37.00; No. 2 heavy copper and wire, 35.00; light copper, 32.75; refinery brass (60% copper) per dry copper content, 33.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 37.00; No. 2 heavy copper and wire, 35.00; light copper, 32.75; No. 1 composition borings, 29.50; No. 1 composition solids, 30.00, heavy yellow brass solids, 20.50; yellow brass turnings, 19.50; radiators, 22.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 65.29; oval, 64.42. 5000-10,000 lb; electrodeposited, 61.25, 2000-5000 lb lots; cast 60.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.165; 200-499 lb, $1.150; 500-999 lb, $1.145; 1000 lb or more, $1.140.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 70.40; 100-600 lb, 62.00; 700-1900 lb, 59.50; 2000-9900 lb, 57.80; 10,000 lb or more, 56.60.

Stannous Chloride (anhydrous): Less than 25 lb, $1.671; 25 lb, $1.321; 100 lb, $1.171; 400 lb, $1.147; 5200-19,600, $1.025; 20,000 lb or more, 90.30.

Stannous Sulphate: Less than 50 lb, $1.298; 50 lb, 99.80; 100-1900 lb, 97.80; 2000 lb or more, 95.80.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

ROLOCK

HEAT AND CORROSION RESISTANT

FABRICATED ALLOYS

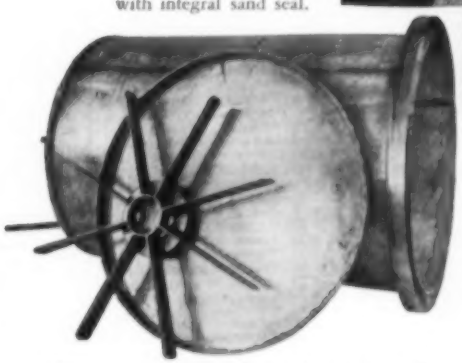
Engineered

FURNACE RETORTS

that SERVE BETTER
LAST LONGER
COST LESS
per furnace hour

Stainless steel hoods for bell-type bright annealing furnaces. 77" O.D. x 88" high.

A special and very successful Rolock design with integral sand seal.



A special design built within a few days without costly patterns.

Here are three of the important furnace retort designs currently fabricated by Rolock specialists . . . each making an impressive record of excellent, low-cost service. Essential features include experienced design and construction engineering . . . unique Rolock know-how and experience in fabricating modern high-heat-resistant wrought alloys . . . quality standards maintained and safeguarded by detailed X-ray and other forms of inspection. Write for our new comprehensive catalog, or send your prints for quotation.

SALES AND SERVICE REPRESENTATIVES FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONN.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

3RLSG

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 201; to footnotes, page 203.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 ..... 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 78.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 ..... 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
S.Chicago,Ill. R2, U5 ..... 68.50
S.Duquesne,Pa. U5 ..... 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 ..... 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 ..... 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 94.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston 85 ..... 101.00
Johnstown,Pa. B2 ..... 84.50
Lackawanna, N.Y. B2 ..... 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 96.90
S.Chicago R2,U5,W14 ..... 84.50
S.Duquesne,Pa. U5 ..... 84.50
S.SanFrancisco B3 ..... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 ..... 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 117.00
Gary,Ind. U5 ..... 96.00
Houston 85 ..... 106.00
Ind.Harbor,Ind. Y1 ..... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 ..... 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 ..... 96.00
S.Duquesne,Pa. U5 ..... 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 ..... 103.50
S.Duquesne,Pa. U5 ..... 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2 ..... 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ..... 4.225

WIRE RODS

AlabamaCity,Ala. R2 ..... 5.375
Aliquippa,Pa. J5 ..... 5.375
Alton,Ill. L1 ..... 5.55
Buffalo W12 ..... 5.375
Cleveland A7 ..... 5.375
Donora,Pa. A7 ..... 5.375
Fairfield,Ala. T2 ..... 5.375
Houston 85 ..... 5.625
IndianaHarbor,Ind. Y1 ..... 5.375
Johnstown,Pa. B2 ..... 5.375
Joliet,Ill. A7 ..... 5.375
KansasCity,Mo. 85 ..... 5.625
Kokomo,Ind. C16 ..... 5.475
Los Angeles B3 ..... 6.175
Minnequa,Colo. C10 ..... 5.625
Monessen,Pa. P7 ..... 5.375
N.Tonawanda,N.Y. B11 ..... 5.375
Pittsburg,Calif. C11 ..... 6.025
Portsmouth,O. P12 ..... 5.375
Roebling,N.J. R5 ..... 5.475
S.Chicago,Ill. R2 ..... 5.375
SparrowsPoint,Md. B2 ..... 5.475
Sterling,Ill.(1) N15 ..... 5.375
Sterling,Ill. N15 ..... 5.475
Struthers,O. Y1 ..... 5.375
Worcester,Mass. A7 ..... 5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 5.10
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.30
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston 85 ..... 4.70
Ind.Harbor,Ind. I-2 ..... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. 85 ..... 4.70
Lackawanna,N.Y. B2 ..... 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 ..... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 5.25
Phoenixville,Pa. P4 ..... 5.15
Portland,Oreg. O4 ..... 5.35
Seattle B3 ..... 5.35
S. Chicago U5, W14 ..... 4.60
S.SanFrancisco B3 ..... 5.25
Torrance,Calif. C11 ..... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.45
Lackawanna,N. Y. B2 ..... 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 ..... 5.15
S.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.45
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston 85 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 ..... 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 6.85
Lackawanna,N.Y. B2 ..... 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 6.75
S.SanFrancisco B3 ..... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 ..... 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 ..... 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.45
Lackawanna,N.Y. B2 ..... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 ..... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 ..... 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 5.35
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.80
Conshohocken,Pa. A3 ..... 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) E1 ..... 5.20
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. P4 ..... 5.10
Houston 85 ..... 4.60
Ind.Harbor, Ind. I-2, Y1 ..... 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 ..... 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 ..... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.725
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14 ..... 4.50
SparrowsPoint,Md. B2 ..... 4.50
Steubenville,O. W10 ..... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1 ..... 4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.35
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 ..... 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High Strength Low-Alloy

Aliquippa,Pa. J5 ..... 5.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 ..... 6.725
Coatesville,Pa. L7 ..... 7.025
Conshohocken,Pa. A3 ..... 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 ..... 7.425
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston 85 ..... 6.825
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14 ..... 6.725
SparrowsPoint,Md. B2 ..... 6.725
Warren,O. R2 ..... 6.725
Youngstown U5, Y1 ..... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 ..... 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 7.00
Gary,Ind. U5 ..... 6.30
Houston 85 ..... 6.40
Ind.Harbor,Ind. Y1 ..... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14 ..... 6.30
SparrowsPoint,Md. B2 ..... 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 ..... 5.575
Harrisburg,Pa. P4 ..... 5.575
Ind.Harbor,Ind. I-2 ..... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill U5 ..... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..... 4.75
Ashland,l.c.l. (15) A10 ..... 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon (Commercial Quality)

Ala.City,Ala.(9) R2 ..... 4.65
Aliquippa,Pa.(9) J5 ..... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala.(9) T2 ..... 4.65
Birmingham C15 ..... 5.15
Bridgeport,Conn. N19 ..... 4.80
Buffalo(9) R2 ..... 4.65
Canton,O.(9) R2 ..... 4.75
Clairton,Pa.(9) U5 ..... 4.65
Cleveland(9) R2 ..... 4.65
Ecorse,Mich.(9) G5 ..... 4.75
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala.(9) T2 ..... 4.65
Fairless,Pa.(9) U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind.(9) U5 ..... 4.65
Houston(9) 85 ..... 4.90
Ind.Harbor,Ind.(9) I-2, ... 4.65
Ind.Harbor,Ind. Y1 ..... 4.65
Johnstown,Pa.(9) B2 ..... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo.(9) 85 ..... 4.90
Lackawanna(9) B2 ..... 4.65
LosAngeles(9) B3 ..... 5.35
Massillon,O.(9) R2 ..... 4.75
Midland,Pa.(9) C18 ..... 4.65
Milton,Pa. M18 ..... 4.80
Minnequa,Colo. C10 ..... 5.10
Niles,Calif. P1 ..... 5.35
N.T'wanda,N.Y.(9) B11 ..... 4.65
Pittsburg,Calif.(9) C11 ..... 5.35
Pittsburgh(9) J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3 N14 ..... 5.40
S.Chicago W14 ..... 4.65
S.Chicago,Ill.(9) R2, U5 ..... 4.65
S.Duquesne,Pa.(9) U5 ..... 4.65
S.SanFran.,Calif.(9) B3 ..... 5.40
Sterling,Ill.(1) N15 ..... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif.(9) C11 ..... 5.35
Warren,O.(9) R2 ..... 4.65
Weirton,W.Va.(9) W6 ..... 4.65
Youngstown(9) R2, U5.. 4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 6.575

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19.. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fairless,Pa. U5 ..... 5.725
Fontana,Calif. K1 ..... 6.625
Gary,Ind. U5 ..... 5.575
Houston 85 ..... 5.825
Ind.Harbor,Ind. I-2, Y1 ..... 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. 85 ..... 5.825
Lackawanna,N.Y. B2.. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14 ..... 5.575
S.Duquesne,Pa. U5 ..... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston 85 ..... 7.05
Ind.Harb.,Ind. I-2, Y1.. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 7.05
Lackawanna,N.Y. B2 ..... 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 ..... 6.80
S.SanFrancisco B3 ..... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 .. 4.80
Lackawanna(9) B2 ..... 4.65

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.55
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.90
KansasCity,Mo. 85 ..... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ..... 8.325
Camden,N.J. P13 ..... 8.35
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 8.575

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 ..... 6.30
Camden,N.J. P13 ..... 6.70
Carnegie,Pa. C12 ..... 6.25
Chicago W18 ..... 6.25
Cleveland A7, C20 ..... 6.25
Detroit B5, P17 ..... 6.45
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.25
Elyria,O. W8 ..... 6.25
FranklinPark,Ill. N8 ..... 6.25
Gary,Ind. R2 ..... 6.25
GreenBay,Wis. F7 ..... 6.25
Hammond,Ind. L2, M13 6.25
Hartford,Conn. R2 ..... 6.75
Harvey,Ill. B5 ..... 6.25
LosAngeles(49) S30 ..... 7.70
LosAngeles R2 ..... 7.70
Mansfield,Mass. B5 ..... 6.80
Massillon,O. R2, R8 ..... 6.25
Midland,Pa. C18 ..... 6.25
Monaca,Pa. S17 ..... 6.25
Newark,N.J. W18 ..... 6.70
NewCastle,Pa.(17) B4 ..... 6.25
Pittsburgh J5 ..... 6.25
Plymouth,Mich. P5 ..... 6.50
Putnam,Conn. W18 ..... 6.80
Readville,Mass. C14 ..... 6.80
S.Chicago,Ill. W14 ..... 6.25
SpringCity,Pa. W3 ..... 6.70
Struthers,O. Y1 ..... 6.25
Waukegan,Ill. A7 ..... 6.25
Worcester,Mass. W19 ..... 6.70
Youngstown F3, Y1 ..... 6.25

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.. 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 ..... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13 7.425
Hartford,Conn. R2 ..... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 ..7.725
Massillon,O. R2, R8 ..7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 5.15
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala. T2 ..... 4.65
Fairless,Pa. U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.80
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla. S5 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 ..... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5 .... 4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ... 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 6.15
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ⅛-1" B2 .. 6.15
Williamsport,Pa. S19 .. 6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 .. 4.65
ChicagoHts.(4) C2, I-2 .. 4.65
Ft.Worth,Tex.(26) T4 .. 5.10
Franklin,Pa.(3) F5 .... 4.65
Franklin,Pa.(4) F5 .... 4.65
JerseyShore,Pa.(4) J8 .. 4.65
Marion,O.(3) P11 ..... 4.65
Moline,Ill.(3) R2 ..... 4.80
Tonawanda(3) B12 .... 5.15
Tonawanda(4) B12 .... 5.15
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks.(S.R.) L5 ... 11.50
McK.Rks.(D.R.) L5 ... 16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 ..... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
Fairless,Pa. U5 ..... 4.375
Fontana,Calif. K1 .... 5.125
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 ..... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2,Y1 4.325
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6 (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .. 4.325
Niles,O. M21 ..... 4.325
Pittsburg,Calif. C11 ... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 ..... 4.55
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2 4.325
Steubenville,O. W10 ... 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .... 4.325
Youngstown U5, Y1 ... 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Niles,O. M21 ..... 5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 .... 7.20
Gary,Ind. U5 ..... 7.20
Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1, U5 .... 7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 ... 6.375
Ecorse,Mich. G5 ..... 6.475
Fairfield,Ala. T2 ..... 6.375
Fairless,Pa. U5 ..... 6.425
Fontana,Calif. K1 .... 7.175
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2 .. 6.375
Warren,O. R2 ..... 6.375
Youngstown U5, Y1 ... 6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ... 4.575
Ind.Harbor,Ind. I-2 ... 4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 ..... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
Fairless,Pa. U5 ..... 5.375
Follansbee,W.Va. F6 .. 5.325
Fontana,Calif. K1 .... 6.525
Gary,Ind. U5 ..... 5.325
GraniteCity,Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Manafield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2.. 5.325
Steubenville,O. W10 ... 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.875
Dravosburg,Pa. U5 .... 7.875
Ecorse,Mich. G5 ..... 7.975
Fairless,Pa. U5 ..... 7.925
Fontana,Calif. K1 .... 9.075
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2.. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 .... 5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry,O. W10 .... 6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 ..... 5.85†
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85†
Dover,O. R1 ..... 5.85†
Dravosburg,Pa. U5 .... 5.85†
Fairfield,Ala. T2 ..... 5.85†
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 .... 6.05
Ind.Harbor,Ind. I-2 ... 5.85†
Kokomo,Ind. C16 ..... 5.95†
MartinsFerry,O. W10 .. 5.85*
Middletown,O. A10 .... 5.85†
Newport,Ky. N9 ..... 5.85†
Pittsburg,Calif. C11 ... 6.60*
Pittsburgh J5 ..... 5.85†
SparrowsPt.,Md. B2 ... 5.85†
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 ... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ..... 6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 ..... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 ..... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 .... 6.10
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. M21 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ... 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. M21 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine& Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest SteelRoll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.325
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7, D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.35-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D2	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
New York W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½¢ lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.85*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Bulter,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½¢ lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Fairless,Pa. U5	8.40	8.65	9.05
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Har. I-2, Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	7.05
Gary,Ind. U5	7.05
GraniteCity,Ill. G4	7.15
Ind.Harbor,Ind. Y1	7.05
Yorkville,O. W10	7.05

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill.L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O. (24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburgh,Calif. C11	7.55
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Millbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
PalmerMass. W12	7.90
Pittsburg,Calif. C11	8.65
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving(8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.50
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.80
Cleveland A7	9.50
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.50
Fostoria,O. S1	9.50
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	9.50
Massillon,O. R8	9.50
Milwaukee C23	9.70
Monessen,Pa. P16	9.50
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	9.60
Rome,N.Y. R6	9.50
Trenton,N.J. R5	9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.65
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill. (1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.45
Bartonville,Ill. K4	9.45
Buffalo W12	9.45
Crawfordsville,Ind. M8	9.45
Donora,Pa. A7	9.45
Duluth,Minn. A7	9.45
Jacksonville,Fla. M8	9.88
Johnstown,Pa. B2	9.45
Joliet,Ill. A7	9.45
Kokomo,Ind. C16	9.45
LosAngeles B3	10.24
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.23
S.Chicago,Ill. R2	9.45
SparrowsPt.,Md. B2	9.55
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.75
Duluth,Minn. A7	9.75
Jacksonville,Fla. M8	10.18
Johnstown,Pa. B3	9.75
Joliet,Ill. A7	9.75
Kokomo,Ind. C16	9.75
LosAngeles B3	10.65
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.55
S.Chicago,Ill. R2	9.75
SparrowsPt.,Md. B2	9.85
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.80
Bartonville,Ill. K4	9.80
Buffalo W12	9.80
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.80
Duluth,Minn. A7	9.80
Jacksonville,Fla. M8	10.23
Johnstown,Pa. B2	9.80
Joliet,Ill. A7	9.80
Kokomo,Ind. C16	9.80
LosAngeles B3	10.60
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.80
SparrowsPt.,Md. B2	9.90
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa,Pa. J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180**
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180**
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN FENCE, 9-15 ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Allq'ppa,Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167**
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

	An'ld Galv. Stone	Stone
WIRE (16 Gage)		
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.50 7.90**
Aliquippa J5	7.40 7.925§
Atlanta A11	7.60 8.20
Bartonville(48) K4	7.60 8.20
Buffalo W12	7.50 7.90†
Cleveland A7	7.50
Crawfordsville M8	7.50 8.10
Donora,Pa. A7	7.50 7.90†
Duluth,Minn. A7	7.50 7.90†
Fairfield T2	7.50 7.90†
Houston(48) S5	7.65 8.05**
Jacks'ville,Fla.M8	7.75 8.35
Johnstown B2(48)	7.50 8.10*
Joliet,Ill. A7	7.50 7.90†
Kans.City(48) S5	7.65 8.05**
Kokomo C16	7.50 7.90†
LosAngeles B3	8.45 9.05*
Minnequa C10	7.65 8.05**
Monessen P7(48)	7.40 8.00††
Palmer,Mass. W12	7.80 8.20†
Pitts.,Calif. C11	8.45 8.85†
Portsmouth,O. P12	7.50
Rankin A7	7.50 7.90†
S.Chicago R2	7.50 7.90**
S.SanFran. C10	8.35 8.75**
Spar'waPt. B2(48)	7.60 8.20*
Str'ling(1)(48)	N15 7.40 8.00††
Struthers,O.(48)	Y1 7.50 8.00‡
Worcester,Mass.A7	7.80 8.20†

Based on zinc price of: *13.50c. †5c. ‡10c. §Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	175
Atlanta A11	175
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	175
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla. M8	180
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.Calif. C10	197
SparrowsPoint,Md. B2	177
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted): ½" x 6" and smaller	61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED

(nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅝" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under...List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.55	20.42
1¼	13	....	25.53	20.45
1½	13	24.24	28.22	22.61
1¾	13	28.63	33.34	26.71
2	13	32.09	37.37	29.93
2¼	13	36.14	42.09	33.72
2½	12	39.23	45.67	36.60
2¾	12	43.22	50.31	40.31
2¾	12	46.79	54.48	43.65
3	12	49.90	58.10	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	(16)5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS, Untreated

Cleveland R2	12.15
KansasCity,Mo. S5	12.90*
Lebanon,Pa. B2	12.15
Minnequa,Colo. C10	12.15
Pittsburgh O3, P14	12.15
Seattle B3	12.65

*Treated

AXLES

Ind.Harbor,Ind. S13	7.50
Johnstown,Pa. B2	7.50
Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. Y1	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.05
Ind.Harbor,Ind. Y1	8.05
Ind.Harbor,Ind. I-2	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	8.05
Minnequa,Colo. C10	7.90
Pittsburgh J5	8.05
Seattle B3	8.55
S.Chicago,Ill. R2	8.05
Struthers,O. Y1	8.05
Youngstown R2	8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
98+% Fe, annealed	9.25
Swedish, c.l.f., Camden, N. J., c.l. in bags	9.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N.Y., in bags	9.50
F.o.b. Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $8.00-275.00. In standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	41.75-65.25†
Bronze, 5000-lb lots	67.50-71.75†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	62.75-65.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add $3.5c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, fiber than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 6.90c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 66" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2½ in. and smaller rounds; 7.95c over 2½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	4	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	8.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets—	Seamless Tube Billets—	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	43.25	45.25	48.00	52.25	52.25
305	23.25	30.25	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	23.50	30.50	38.50	44.25	41.25	43.25	45.50	49.75	52.00	52.00
309	31.00	39.75	46.75	53.50	53.50	52.00	54.75	58.25	67.00	67.00
310	37.25	48.00	62.25	72.25	68.50	69.75	73.50	75.25	78.75	78.75
314	....	....	....	....	....	69.75	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	57.75	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.50	63.25	62.75	65.75	69.00	73.25	73.25
317	37.25	48.25	62.75	72.75	75.50	70.75	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	43.00	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	50.75	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	36.25	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	34.50	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp., Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates Carbon Base 10%	Plates Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	33.75	42.75

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	....	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C15, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 2% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.50‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.79	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y. deld.	63.02	63.52	64.02	....
Syracuse,N.Y. deld.	64.12	64.62	65.12	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich. deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	60.00	60.50	60.50	61.00
Akron,O. deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
NewYork, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland,Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,NY. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
NevilleIsland,Pa. P6	60.00	60.50	60.50	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	61.95	61.95	62.48
McKeesRock, deld.	....	61.60	61.60	62.13
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	62.26	62.26	62.79
Verona,Trafford, deld.	62.29	62.82	62.82	63.35
Brackenridge, deld.	62.60	63.10	63.10	63.63
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton,Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Youngstown U5	60.00	....	....	61.00
Mansfield,O. deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	67.50	68.00	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry. (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 (Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	65.00

Warehouse Steel Products

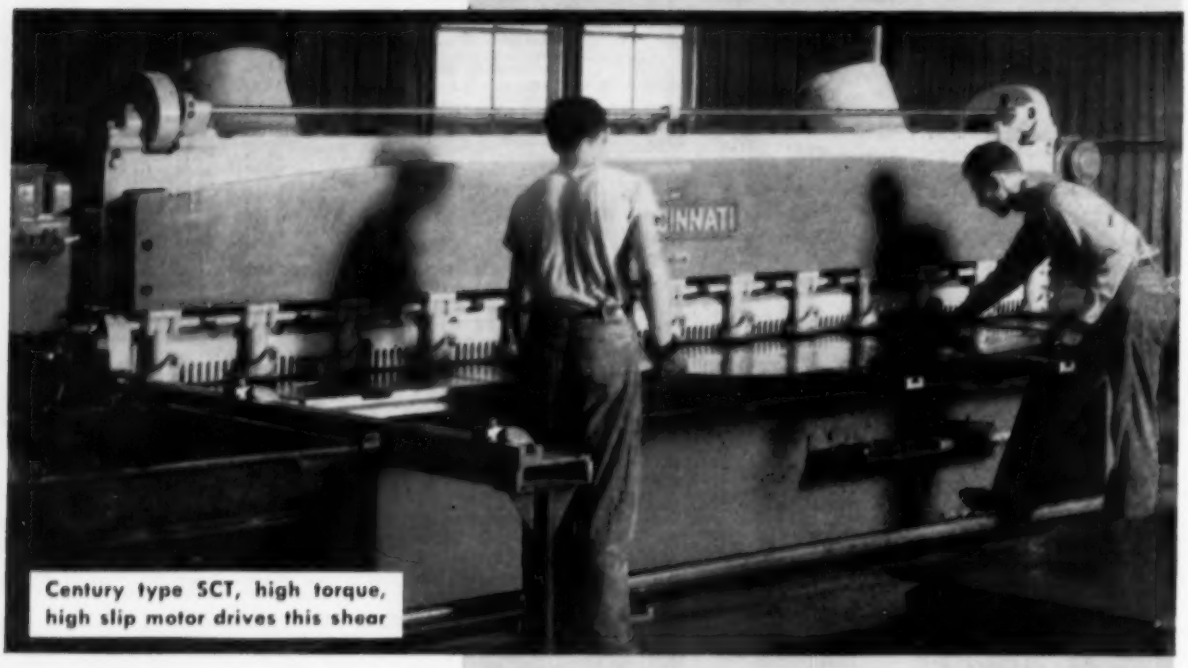
Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.48	7.42	....	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	....	8.49[8]	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.73	13.56	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.35	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.05	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.29	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.11	7.76	7.62	8.89
Denver	8.95	10.31	11.73	....	9.10	9.10	....	9.82	17.87	8.95	9.10	10.50
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.25	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95[10]	....	7.31	7.35	....	8.10[10]	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	....	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.44
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.35	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.14	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	....	8.00	....	7.63	7.34	....
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.47	8.11	8.21	9.50
Norfolk, Va.	7.35	....	....	....	7.80	7.85	....	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	45.98	7.99	7.73	8.26	8.52	13.25	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.21	7.27	7.80	8.00	13.05	7.43	7.45	8.72
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	....	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	....	9.49	....	7.85	7.85	....	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.34	7.83	7.74	9.01
St. Paul	7.46	8.59	9.18	....	7.72	7.74	....	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.35[8]	8.25	8.30	10.50
Seattle	7.85	10.50	10.99	54.00	8.90	8.60	9.15	12.25	14.65	8.50	8.50	10.70
Spokane, Wash.	8.90	11.25	11.95	....	9.05	8.75	9.30	12.40	15.55	8.65	8.65	11.35
Washington	7.78	9.80	8.89	....	8.49	8.24	....	9.40	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extrs excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ⅝-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.

designed to absorb heavy shock load...



Century type SCT, high torque, high slip motor drives this shear

Century

Performance-Rated© MOTOR EXACTLY FITS THE NEED ON THIS SHEAR

To get full value from your equipment, motor performance must match machinery requirements. Whether the horsepower need is large or small, Century Performance-Rated Motors can supply the performance characteristics you require.

This shear has a Century Motor selected for proper size, speed, and torque with "high slip" characteristics. When the clutch is actuated, energy stored in the flywheel during the idle part of the cycle is used to drive the shear. As the load comes on, the motor speed pulls down—thus cushioning the shock of the load. This saves impact on the shear and motor, reduces power line surge and permits use of a Century Motor *Performance-Rated* to do the job without excess horsepower.

Century Performance-Rated Motors are designed in a wide range of torque, speed, mounting and frame characteristics. Call your nearby Century authorized distributor, or contact our District Sales Office.

Performance-Rated©
MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street, St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

U. S. Steel Corp.

Heavy industrial, commercial construction plans mean . . .

Heavy Demand for "Re" Bars

"'RE' BARS are going to be the strongest product in the third quarter when other forms of steel slip a bit." That's the opinion of one confident reinforcing bar salesman, and it pretty well sums up the attitude prevalent in this segment of the steel industry. There's sound basis for it, too.

Take the construction industry, the biggest customer for most of the producers. It's booming now, and with the expansion plans already announced for the next decade, it'll be booming for some time to come. Heavy industrial buildings are the most important. Steel mills are their own best customers in this case. But even commercial buildings, especially reinforced concrete structures, use large tonnages of reinforcing bars. "With structurals in tight supply," says another salesman, "more builders are turning to reinforced concrete for structural strength. As long as there's a large backlog of orders for fabricated structural steel, there will be good demand for 're' bars." (That backlog is at a near record high of 2,463,000 tons.)

Unmeasured Potential — Or take highway construction, the second largest consumer. Demand is at peak levels for reinforcing overpasses, underpasses and cloverleafs on superhighways. When the government roadbuilding program gets under way, it will increase demand for deformed reinforcing bars by about 1.3 million tons a year, according to a study made by the American Road Builders' Association. Congress seems sure of passing this program this year.

That won't have any bearing on this year's sales, though. Even at that, one producer says the industry probably will better the 1955 record shipments of 2,164,641 tons by 10 or 15 per cent. American Iron & Steel Institute figures for the first two months back that up. The cumulative total is 356,039 tons, compared with only 243,969 tons for January and February last year. Both March and April of this year may have set new records, too. Books for the third quarter are open, and one Chicago producer notes that "no one has refused his allocation yet." Fourth quarter prospects look just as good.

Beyond Capacity — The industry's rated capacity is close to 2 million tons a year. So it is evident that producers are "borrowing" rolling space from other bar mills. There is some expansion going on, but most producers say they will continue to borrow space as long as it is practical. However, if the automotive industry and agricultural machinery makers come alive at the same time, there will likely be a pinch on supply.

Reinforcing bar producers aren't the least bit worried about an inventory buildup. "Our fabricators haven't had time to build up much of a stock. They've had all they can do to fill their orders," says one sales manager. There have been scattered weak spots in new orders recently, but heavy backlogs more than offset this. "Undoubtedly there is some buying against a price rise, but it doesn't amount to much," says an assistant sales manager.

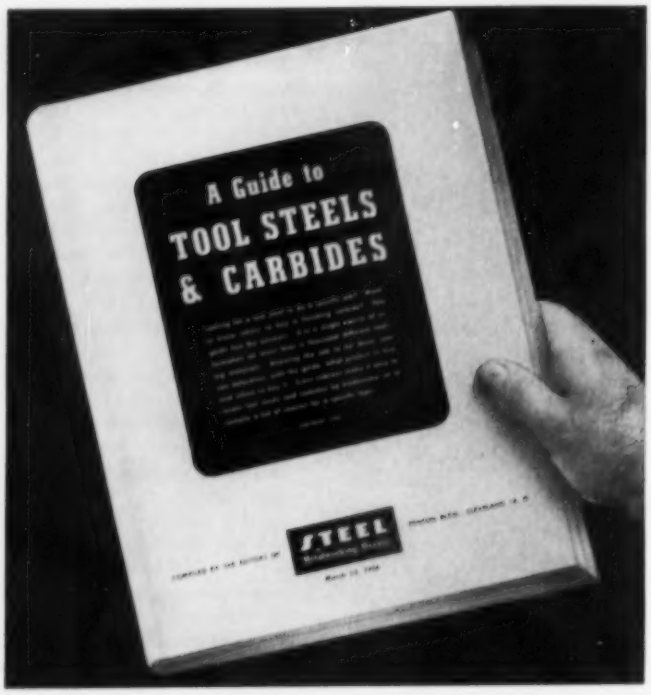
Big Problem—About the only immediate major problem confronting the industry is an ingot shortage. This is especially true of rerollers of rail steel. Rails are tight. Prices—as high as $80 per ton for scrap rails in some areas—make it uneconomical to buy in large quantities. When possible, some rerollers are turning to scrap axles or new billets.

Steel Bars . . .

Bar Prices, Page 180

Demand is active for heavy carbon round bars (3 in. and over) and for wide thick flats. Otherwise, trading is moderate, but sufficient to keep mills well engaged over the remainder of this quarter.

Some uncertainty has developed concerning early third quarter demand. Part of the current buying is protective, which may result in a let-



HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

JUST PUBLISHED — 40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.	51 to 100	1.80 ea.
11 to 50	1.90 ea.	101 to 200	1.70 ea.
	over 200	1.60 ea.	

down in mid-summer. Producers say specifications are coming out fairly well and generally do not anticipate a sharp drop.

Cold-finished bar deliveries are improving, and most sizes can be shipped from stock. Producers say none of their products are in heavy demand for the next three months. As a result, they can relax their ordering of hot-rolled bars. Alloy bar business still lags.

Tin Plate . . .

Tin Plate Prices, Page 202

Demand for tin mill products is increasing steadily. Buyers will take all they can get. Black plate delivery schedules are moving out and now extend through July in some instances.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 201 & 202

Some increase in third quarter hot-rolled sheet demand is noted, partially due to protective buying. Fabricators are getting onto order books so that they will be high on the list after a strike, should one develop.

Over the remainder of this quarter, producers will have all the tonnage they can handle.

Galvanized sheet supply is tightening due to seasonal influences and to the placing of orders for the government's grain storage bin program. This program will require more than 60,000 tons of steel, mainly galvanized sheets. Specifications call for delivery of completed bins by July 31. Distribution of the 30,765 bins is: 16,005 units to Butler Mfg. Co., Kansas City, Mo.; 7010, to Steel Co. of Ohio, Columbus, O.; 3000, to Black, Sivalls & Bryson Inc., Kansas City, Mo.; 2500, to Kilby Steel Co., Anniston, Ala.; 2250, to Columbia Steel Tank Co., Kansas City, Mo.

Plates . . .

Plate Prices, Page 200

One midwestern steelmaker is installing wider rolling facilities which may help the plate situation slightly late this year or early in 1957.

The $11-a-ton advance in carbon and carbon-abrasive plates at Claymont, Del., may be a preview of things to come. At least it indicates a sharp advance in plates by other producers this summer.

Colorado Fuel & Iron Corp., the Claymont producer, has been forced to blank out practically all of the second quarter because of mechanical difficulties experienced earlier.

Virtually all platemakers have opened books for July; some, for the entire quarter. Requirements are

Cleveland *Top Quality* Fasteners give you EXTRA Fastenability

(Big word that means extra fast trouble-free driving them in where you want them)

"The usual industry quality standards aren't high enough," Cleveland engineers were told. "Start there and work up."

What they have accomplished shows up in lower assembly costs in your shop—via super-accurate forming to close tolerances, scrupulously clean threads with perfect concentricity and uniform lead, flawless washer faces, sharp cornered heads that won't slip in your tools, points flat and normal to the screw's axis . . . all of which mean extra fastenability.

Higher tensile too—these cold forged double-extruded cap screws made by Cleveland's own Kaufman Process now give you extra margins of strength.

No extra charge for any of these fasteners that help you put together a better product. Ship-at-once stocks of every kind and size we make! Ask your jobber for Cleveland Fasteners—or write us for latest stock list.

WAREHOUSES:
CHICAGO • PHILADELPHIA • NEW YORK
PROVIDENCE • LOS ANGELES

Originators of the
Kaufman DOUBLE EXTRUSION Process

The Cleveland Cap Screw Company

2935 East 79th Street, Cleveland 4, Ohio • VUlcan 3-3700 • TWX CV 42

At Design Engineering Show, Booth 324 • NAPA Inform-A-Show, Booth 237

heavy and consumers are accepting quotas as fast as offered. Heavier shipyard requirements are aggravating the supply situation.

Warehouse . . .

Warehouse Prices, Page 205

Distributors' inventories of bars, cold-finished and galvanized sheets are fairly satisfactory in most districts. This permits warehouses to improve service and boost sales of those products.

Supply of other items is tightening and is still critical in plates and structurals. Several sizes of structurals, including lightweight beams, are almost impossible to obtain in some districts.

Some pipe distributors are in the midst of adjusting pipe prices in line with the 3 per cent advance announced recently by the leading producer. The advance appears likely to be followed by other producers, although not all have taken action.

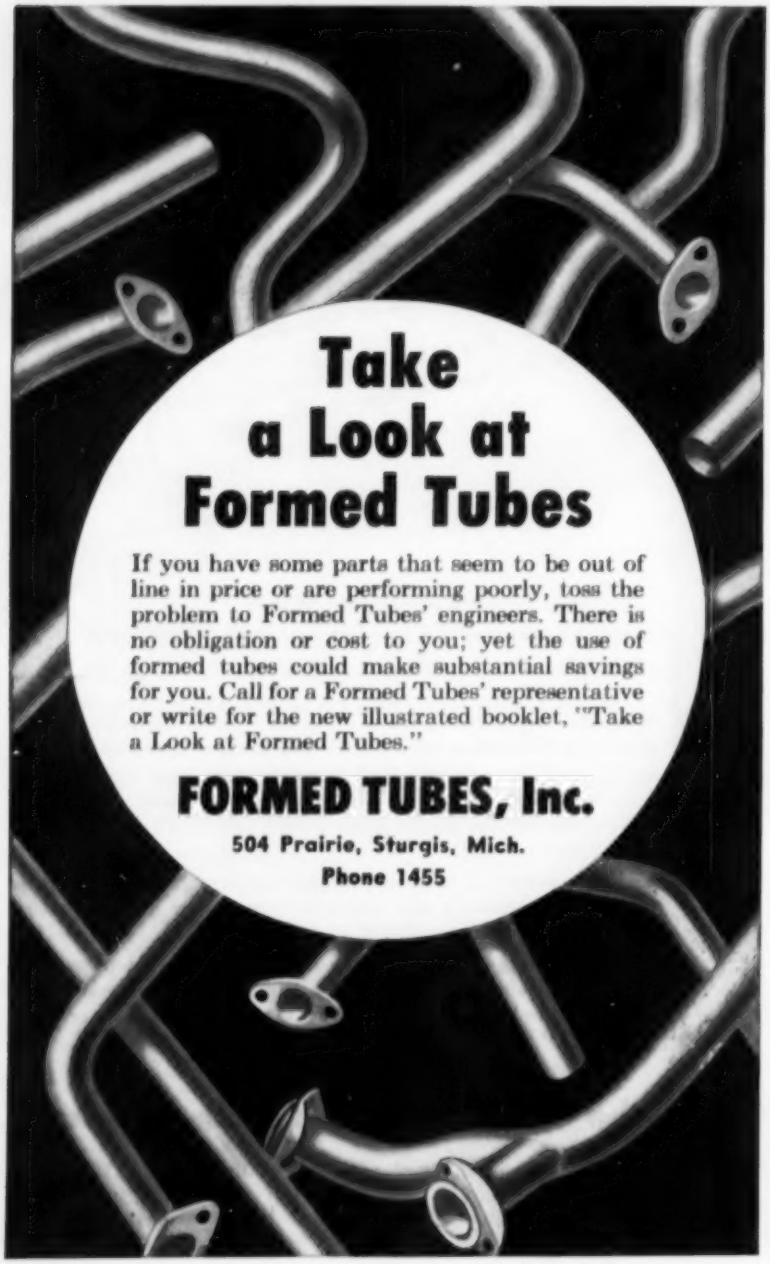
Tubular Goods . . .

Tubular Goods Prices, Page 204

Tubemakers enjoy a good balance in orders. All products are selling well, and only oil country goods and line pipe are in tight supply. Producers of oil country tubing expect a brisk market to continue through the rest of this year. Although the number of new wells to be drilled this year may reach an all-time high, tubemakers have sufficient capacity.

National Tube Division, U. S. Steel Corp., increased boiler tube prices, effective as of May 3, an average of between 2 and 3 per cent.

United States Steel Export Co. revised export pipe price bases, effective with shipments from producing mills May 2. Under the revised schedule, standard pipe (threaded and coupled) is minus 0.1 per cent discount for seamless, black, 2 in.; plus 17.9 per cent discount for seamless, galvanized, 2 in.


Take
a Look at
Formed Tubes
If you have some parts that seem to be out of line in price or are performing poorly, toss the problem to Formed Tubes' engineers. There is no obligation or cost to you; yet the use of formed tubes could make substantial savings for you. Call for a Formed Tubes' representative or write for the new illustrated booklet, "Take a Look at Formed Tubes."
FORMED TUBES, Inc.
504 Prairie, Sturgis, Mich.
Phone 1455

Wire . . .

Wire Prices, Pages 202 & 203

Contracts for over $1 million for highway fencing are being placed by the New York State Thruway Authority. Cyclone Fence, American Steel & Wire Division, U. S. Steel Corp., is low on Catskill and Hudson sections; two contracts, $577,192, including erecting. For the Ontario section, Anchor Post Products Inc., Albany, N. Y., is low at $436,397.67. Total bids ($1,013,589.67) are below engineering estimates ($1,416,000).

Pig Iron . . .

Pig Iron Prices, Page 205

Shipments of pig iron are steady. Consumption in most areas has dipped slightly, but some foundries are beginning to buy more for stockpiling in anticipation of another price increase early this summer.

Shipments of iron to New England from New York state and other distant furnaces are slightly heavier, supplementing those from the Everett furnace's stockpile. The Everett reserve is being stretched out among contract customers until operation is resumed around midyear.

The foundry melt in the northeast is up slightly; textile equipment shops are more active on normal casting requirements and some on subcontracts. One textile shop is casting catch basins and affiliated tonnage for the Massachusetts Turnpike.

Structural Shapes . . .

Structural Shape Prices, Page 200

Structural steel remains extremely tight. Fabricators are booked ahead one year and beyond in some instances. Some of the smaller shops, which are not booked so far ahead, hesitate to commit themselves farther because of the uncertainty of supplies. Larger shops are being bothered by the same consideration, but

in a lesser degree because of the possibility that the stringency will ease by the time their more extended delivery promises have to be met.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5500 tons, Washington-Oregon interstate Columbia river bridge, to Judson, Pacific, Murphy Co., Oakland, Calif.; Guy F. Atkinson Co., South San Francisco, Calif., general contractor.

1560 tons, 34 tunnel diversion gates, Long Sault dam, St. Lawrence Power project, New York, to Alco Products Co., Dunkirk, N. Y.

1500 tons, plant at Anaheim, Calif., for Standard Pressed Steel Co., Jenkintown, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1125 tons, plant at Houston for Rohm & Haas, Philadelphia, to a southwestern fabricator.

415 tons, Philadelphia High School for Girls, that city, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, substation structures, Bonneville Power Administration, Portland, Oreg., to Bethlehem Pacific Coast Steel Corp., San Francisco.

230 tons, railroad bridge (Pennsylvania-Reading-Seaboard), Westville, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

120 tons, high school, North Easton, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Franchi Construction Co., Newtonville, Mass., general contractor; 55 tons, reinforcing steel, Barker Steel Co., Boston.

100 tons, three-span rolled beam bridge, Madison, Conn., to McDermott Steel Products Co., Hartford, Conn.; D. Arrigoni, Middletown, Conn., general contractor.

STRUCTURAL STEEL PENDING

11,150 tons, east and west approaches to Greater New Orleans bridge for Mississippi River Bridge Authority; bids May 22.

2000 tons or more, superstructure, Morrison street bridge, Portland, Oreg.; American Bridge Division, U. S. Steel Corp., low, to Multnomah county commissioners.

1800 tons, bridge, Elizabeth river, Norfolk-Portsmouth Belt Line, Norfolk, Va.; bids May 15.

1200 tons, cadet dining hall, Air Force Academy, Colorado Springs, Colo.; bids about June 12, direct to Academy Construction Agency.

580 tons, high school, Mifflin county, Pennsylvania; bids closed May 8.

220 tons, two I-beam bridges, Allenstown-Pembroke, N. H.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1600 tons, Pelton dam, Deschutes river, Oregon, to Mercer Steel Co., Portland, Oreg.; Guy F. Atkinson, South San Francisco, Calif., general contractor; placing sublet to Steelfab Inc., Castroville, Calif.

1100 tons, Washington-Oregon interstate Columbia river bridge, to Soule Steel Co., Portland, Oreg.; general contract to Guy F. Atkinson Co., South San Francisco, Calif.

150 tons, Weyerhaeuser Timber Co.'s pulp mill, Cosmopolis, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

103 tons, Elks' hall, Anchorage, Alaska, to Bethlehem Pacific Steel Corp., Seattle.

REINFORCING BARS PENDING

160 tons (including shapes), 30-mile canal lateral project; bids to Bureau of Reclamation, Ephrata, Wash., June 5.

100 tons, Washington state highway project, Spokane (Wash.) county; general contract to Murphy Bros., Spokane.

100 tons or more, 23 ammunition igloos, Ft. Lewis, Wash.; John P. Hopkins Co. Inc., Mercer Island, Wash., low, to U. S. Engineer.

100 tons or more, approaches to Sandpoint bridge, Idaho state project; general award to Carbon Bros., Spokane, Wash.

PLATES . . .

PLATES PENDING

500 tons, tanks, oil storage, Quincy Oil Inc., Quincy, Mass.

750 tons, tanks, oil storage, Socony Mobile Oil Co. Inc., East Boston, Mass.

100 tons, 200,000-gal water storage tank, Blytheville Air Force base, Ark.; bids May 17, base contracting officer.

750 tons, armor plate, homogeneous, Ordnance Tank Automotive Command, Detroit; bids May 14.

PIPE . . .

CAST IRON PIPE PLACED

314 tons, 6 to 12-in. cast iron pipe, Santa Clara water district, Eugene, Oreg., to U. S. Pipe & Foundry Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Argentine Ministry of Transport, 200 diesel units, with specifications and drawings available for borrowing at Commercial Intelligence Division, Bureau of Foreign Commerce, Washington.

Northern Pacific, 80 diesel-electric units, to Electro-Motive Division, General Motors Corp., LaGrange, Ill. List comprises 40 road switchers, 17 yard switchers, 5 four-unit freight locomotives and 1 three-unit passenger locomotive.

Texas Pacific, six road switching units, to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

RAILROAD CARS PLACED

Grand Trunk Western, 500 fifty-ton automobile boxcars, to ACF Industries Inc., New York; 100 seventy-ton flatcars, to Magor Car Corp., New York.

St. Louis Southwestern, 50 seventy-ton flatcars with cast steel underframes, to its Pine Bluff, Ark., shops.

RAILROAD CARS PENDING

300 diesel passenger cars, reportedly up for inquiry.

CORROSION
is a luxury
you can't afford!
Protect your investments with
Harco Cathodic Protection Systems
Every ferrous metal structure you own (underground pipe lines, oil and water storage tanks, water works equipment, etc.) is being stolen from your profits.
Harco's job is to protect you. Cathodic protection systems by Harco will STOP corrosion in its tracks. What's more, Harco job-engineered-systems provide the necessary testing, drawings, materials and installation.
A Harco Cathodic Protection System will pay for itself many times over. It costs nothing to investigate the tremendous savings available to you.
THE HARCO CORPORATION
16981 Broadway
Cleveland, Ohio
Write today for catalog
or call MOntrose 2-2080
4708-HC
Harco
CATHODIC PROTECTION DIVISION
Cleveland • New York • Chicago • Philadelphia • Detroit • St. Louis • Louisville • Minneapolis • Oklahoma City
Los Angeles • Seattle • Houston • Atlanta • Lynchburg • Pittsburgh • Albany • Davenport • Toronto, Canada

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215, Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%. Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.8c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02% max 35.50c, 0.03% max 35c, 0.06% max 34.50c, 0.1% max 36c, 0.15% max 33.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 65c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

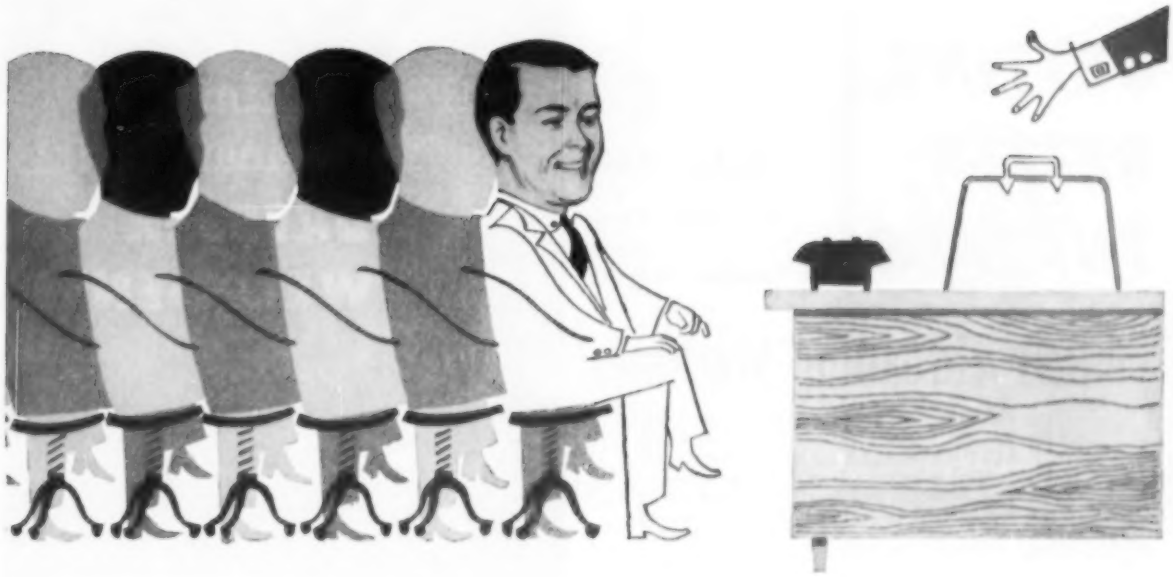
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.



You can't complete a sale with a fraction of the buyer!

In industry, the "buyer" isn't a single individual. Even in a small plant, the buyer is likely to be a group of anywhere from three to a dozen or more men, and back of the men who participate directly in a buying decision are many others who are in a position to influence purchases. In many cases the salesman cannot meet all of the direct participants, and usually meets almost none of those behind the scenes. In effect, he sees only a fraction of the buyer.

One very important function of industrial advertising is to carry the story of product and company to the men whom the salesman cannot see.

These behind-the-scenes buying influences represent many different functions, interests, and points of view. One man may be concerned only with price, another with production, while still another may have the task of balancing benefits against cost or against possible benefit from the same expenditure for a totally different purpose. Some men will be concerned with evaluating your product in comparison with competing products, and their evaluation may include opinions from men in the shop who will be responsible for its operation, use or maintenance.

The only way to reach all of these men is by means of carefully-planned industrial advertising, utilizing all pertinent media and designed to bring to each person the type of information he needs for his part of the buying decision. Only when personal selling is "teamed up" with adequate advertising do you reach the *total* buyer.

National Industrial Advertisers Association, Inc.

271 Madison Avenue, New York 16, New York

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

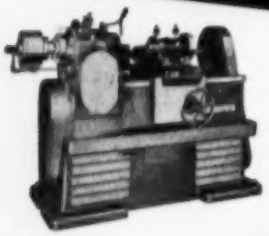
GETTING BETTER THREADS

. . . in Less Time
. . . at Lower Costs
is Coulter Magic!

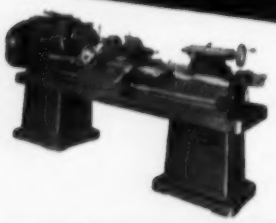
Coulter Threading Machines

Day-in and day-out production figures show that COULTERS produce threaded parts FASTER . . . AUTOMATICALLY . . . on non-ferrous and heat treated metals . . . long and short runs . . . all sizes diameters and lengths . . . high speed production milling. COULTERS start earning their way the moment you make the first threads. Perform with accuracy and ease of handling normally found only on much heavier, more expensive machines.

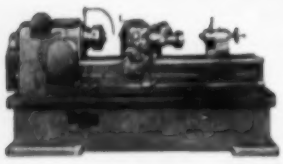
THREE COULTERS *for your threading needs!*
Each machine has its own design features; engineered for low and high speeds, quick change-overs, individual versatility.



"H1" Completely automatic for precision internal and external right and left hand threads, 4 to 50 per inch. Internal: ⅝" to 8". External: 3/16" to 7".



TYPE "A" MODEL "L1" This is the most versatile lathe built for fast production of Square, Standard and 29 degree threads, internal and external. Has over 25 alternatives for setting up the threading tools. Capacities: up to 195" length of thread.



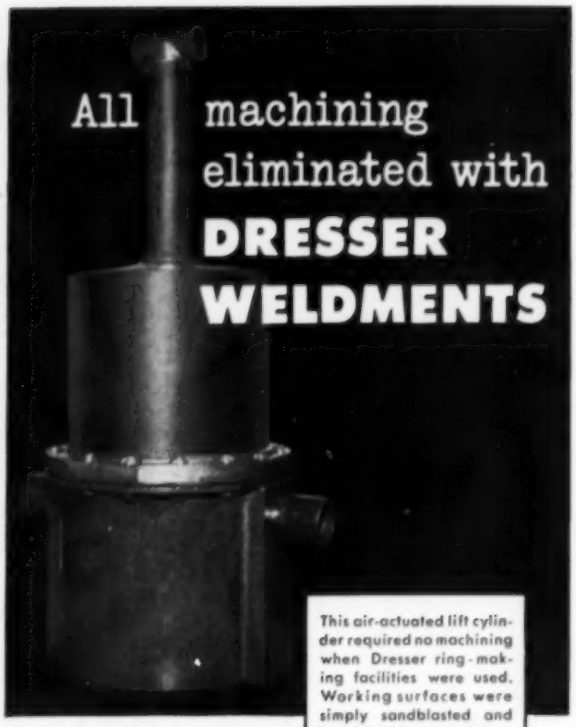
"THREADMASTER" Produces, automatically, long and short traversing, elevating cross feed lead screws with over 55 changes of the work spindle. Mills threads from 1/3 to 20 per inch and leads from .05 to 5.5".

See for yourself how these rugged COULTER THREADING MACHINES can save you money! Ask your COULTER Dealer about them today, or write direct. Literature and engineering service available, of course.

Machine Tool Builders Since 1896

The *James Coulter Machine Co.*

631 Railroad Ave. Bridgeport 5, Conn.



This air-actuated lift cylinder required no machining when Dresser ring-making facilities were used. Working surfaces were simply sandblasted and burnished for smoothness.

Machining operations can be considerably reduced, sometimes eliminated, with Dresser Weldments. The first step is to think of your product's design in terms of rings—then consult with Dresser.

Instead of using heavy castings for circular parts, Dresser provides steel cylinders accurately sized and welded. Expensive man-hours for machining are reduced.

If you have a product using generally circular parts, call on Dresser know-how to save machining time, speed production, reduce scrap losses. Send for catalog number 56-S which tells how. No obligation.

Typical Dresser Weldments

- *Rings and Cylinders*—circular elements, may also be combined into composite weldment.
- *Hot-Formed Circular Parts* — extensive banks of presses and furnaces offer you economies in volume production.
- *Shafts or Circular Parts Welded from Dissimilar Metals* — available with a portion of the part resistant to heat, corrosion or abrasion—or provided with greater strength or hard surface in a localized section.

We'll gladly make recommendations at no cost to you. Just send sketch or print.

ONE OF THE DRESSER INDUSTRIES

DRESSER WELDMENTS

Dresser Manufacturing Division

110 FISHER AVENUE • BRADFORD, PA.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, $1.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% 13.00c, f.o.b. Victoria.	

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.00-$35.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.15 nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haideman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Philadelphia, Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Chicago, deld.	28.50
Detroit, ovens	27.50
Detroit, deld.	28.50
Pontiac, deld.	29.06
Saginaw, deld.	30.58
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.50
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

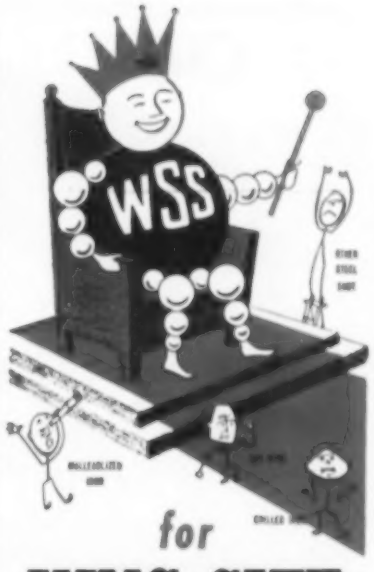
Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90



for

KING-SIZE

savings in cleaning or peening specify WHEELABRATOR® STEEL SHOT

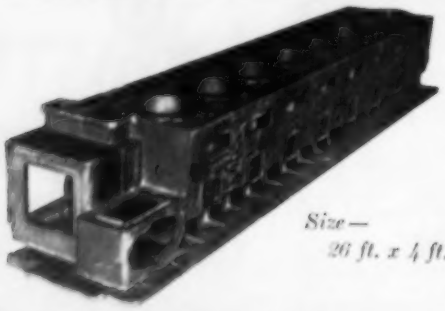
COMPANY	COST COMPARISON		SAVINGS IN ABRASIVE COSTS
An Ohio Steel Foundry	$1.33/ton cleaned	$.57/ton cleaned	60%
A Chicago Malleable Foundry	$1.10/ton cleaned	$.60/ton cleaned	45%
A Steel Processing Plant	$.57/ton cleaned	$.32/ton cleaned	45%
A Cleveland Area Iron Foundry	$.465/ton cleaned	$.25/ton cleaned	46%

You, too, can make savings of 45% to 60% in your blast cleaning or peening costs the way the arms above have done. Join the more than 1,000 firms that have changed to Wheelabrator Steel Shot in the last two years and let Wheelabrator Steel Shot make king-size savings for you. Start using it today.

Write today for Bulletin 89-C

WHEELABRATOR CORPORATION

509 South Byrkit Street
Mishawaka, Indiana



Size—
20 ft. x 4 ft.

PRECISION
GRAY IRON • ALLOY IRON • DUCTILE IRON
CASTINGS

CEMENT BONDED SAND METHOD

CHAMBERSBURG
ENGINEERING COMPANY
"THE HAMMER BUILDERS"

641 Derbyshire Street — Chambersburg, Penna.

WIDE FLANGE BEAMS
—Prompt Shipment—

4"	@	13#	10"	@	15#	12"	@	45#
6"	@	20#	10"	@	21#	14"	@	30#
6"	@	22.5#	10"	@	33#	14"	@	34#
6"	@	27.5#	12"	@	27#	14"	@	38#
8"	@	10#	12"	@	31#	14"	@	43#
8"	@	17#	12"	@	36#	14"	@	53#
8"	@	28#	12"	@	40#	14"	@	58#
8"	@	35#	Mill Lengths and cut to size					

We can furnish 1 (one) Beam or carloads. Other sizes available in Wide Flange Beams, other Structurals, Plates, Bars, etc.

PHONE • WIRE • WRITE
ASSOCIATED STEEL CORPORATION
600 S. Michigan Avenue—Chicago 5, Illinois
— All Phones Webster 9-5969 —

INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS
By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

246 pages — 4 tables
69 illustrations — Price $5.00 Postpaid

THE PENTON PUBLISHING CO.
Book Department, 1213 W. 3rd St., Cleveland 13, O.

★ . . . for any information about bearings and bearing metals, consult with the A. W. Cadman Mfg. Co., master makers of fine bearing metals since 1860.

PITTSBURGH	*28th and Smallman Streets*
PHILADELPHIA	*18 W. Chelten St.*
CHICAGO	*Manhattan Bldg.*
NEW YORK	*150 Nassau St.*

H&G Insert Chaser DIE HEADS

famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *F. P. Barber Machinery Co., Toronto, Canada.*

HOT DIP GALVANIZING
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert Street
Phone: Re-9-8911 — Philadelphia 25, Pa.

Polished Stainless Steel Tubing by DAMASCUS . . .

CAN Replace Chrome Plated Brass in many applications and gives you a better product at no increase in cost!

Polished or Buff Finish 1/2" to 2-1/2" O. D.

DAMASCUS TUBE COMPANY
STAINLESS STEEL TUBING AND PIPE
Dept. S
Greenville, Pennsylvania

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.75	6.75	6.75	7.15
Structural Angles	7.05	7.05	7.05	7.45
I-Beams	7.45	7.45	7.45	7.85
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	8.75	8.75	8.75	9.15
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	6.80	6.80	6.80	7.20
Hot-Rolled Bands	7.10*	7.10*	7.10*	7.50*
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails (‡)	7.60	7.60	7.60	8.00

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net. reel. ‡Per 100-lb kegs. 20d nails and heavier

Scrap . . .

Scrap Prices, Page 218

Pittsburgh—A large independent mill here bought No. 1 heavy melting scrap for $52; No. 2 heavy melting, $46; No. 2 bundles, $44. This is a continuation of the downward tendency in prices. Reasons for easing in supply are improved weather, higher prices in the early second quarter which brought out larger tonnages and some fear of a steel strike slowing third quarter scrap consumption.

No. 1 heavy melting dropped $2 a ton below previous quotations, while cut structurals and railroad scrap grades dropped $2 to $3. Turnings and borings remained steady, as demand has not fluctuated sharply for those grades.

Philadelphia — Major open-hearth grades of scrap are off nominally $1 a ton, with little to test the situation. No. 1 heavy melting, bundles and busheling are $56, delivered; No. 2 heavy melting, $47; No. 2 bundles, $45. Other changes comprise a $1 reduction in electric furnace bundles to $57, based on trading. A similar drop was recorded in structural and plate to $58-$59; in rail crops (2 ft and under), to $67.

Prices on borings and turnings are firm, based on steady demand for blast furnace and open-hearth use. Cast grades also are unchanged. The Fairless, Pa., consumer recently added to purchases of No. 1 cupola cast at $52.

Boston—Heavy melting steel scrap prices crashed $3 a ton. Brokers also lowered bids on lighter industrial grades an average of $2 a ton. For delivery to New England mills, brokers are paying $45, f.o.b. shipping point, for No. 1 steel, busheling and bundles. This is off $6 from the high peak one month ago. For eastern Pennsylvania, these grades are $44, shipping point. The decline in cast scrap was less sharp.

New York—Scrap brokers reduced buying prices on No. 2 heavy melting to a range of $39-$40 and on machine shop turnings to $28-$29. All other steel grades were unchanged last week, although the undertone was weak. Export demand is supporting the market on the major open-hearth grades.

No. 1 cupola cast is higher at $44-$45, this being more of an adjustment than any particular display of strength.

Buffalo—The local scrap market has been stabilized by a mill purchase at prevailing prices for No. 2 heavy melting steel and No. 2 bundles.

No. 1 heavy melting declined $2 a ton to $54. The $56 price had been maintained by out-of-district shipments. But buying by sources at Youngstown and Pittsburgh has declined sharply.

Low phos scrap declined $1 to $57, but there is still a strong demand for this and other specialty grades. Supplies of secondary mill grades are more plentiful than No. 1 grades.

(*Please turn to page 220*)

YOUR BEST BUY

FOR ECONOMICAL, DEPENDABLE SOLDERING

RUBYFLUID flux—liquid or paste—gives neat, strong unions, consistently. Wets out freely . . . fast acting . . . easy to use . . . free from objectionable fumes.

RUBY CHEMICAL CO.
75 S. McDowell Street
Columbus 8, Ohio

Rubyfluid

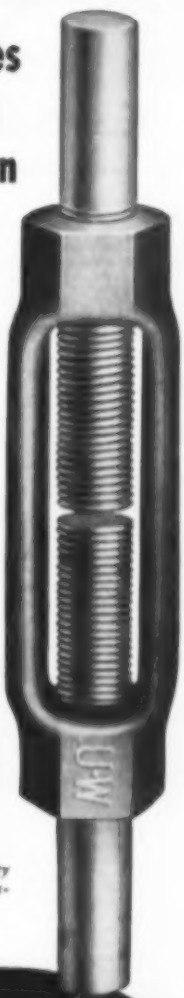
UPSON-WALTON

turnbuckles you can depend on

Weldless, hex-end bodies are drop forged from special bar quality forging steel.

Heads are drilled and tapped in perfect alignment, so that end fittings pull evenly.

Threading is American National Course series, class 2 fit, for easy assembly.



In the long run quality costs less. Specify Upson-Walton turnbuckles.

ENGINEERED FOR SAFETY

For prompt service call your U-W Distributor. Write for free catalog on wire rope fittings.

THE UPSON-WALTON COMPANY
12500 ELMWOOD AVENUE
CLEVELAND 11, OHIO
New York • Chicago • Pittsburgh
MANUFACTURERS OF TACKLE BLOCKS, WIRE ROPE, ROPE FITTINGS • ESTABLISHED 1871

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 9	$53.00
May 2	55.00
Apr. Avg.	54.87
May 1955	34.87
May 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	*38.00-39.00*
Mixed borings, turnings	*38.00-39.00*
Short shovel turnings	42.00-43.00
Cast iron borings	42.00-43.00
Cut structurals, 3 ft lengths	*62.00-63.00*
Heavy turnings	50.00-51.00
Punchings & plate scrap	*62.00-63.00*
Electric furnace bundles	*61.00-62.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Charging box cast	*47.00-48.00*
Heavy breakable cast	*47.00-48.00*
Unstripped motor blocks	35.00-36.00
No. 1 machinery cast	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt	*61.00-62.00*
Rails, 2 ft and under	*70.00-71.00*
Rails, 18 in. and under	*71.00-72.00*
Rails, random lengths	*65.00-66.00*
Railroad specialties	*65.00-66.00*

Stainless Steel Scrap

18-8 bundles & solids	345.00-355.00
18-8 turnings	240.00-250.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	54.00-55.00
No. 2 heavy melting	46.00-47.00
No. 1 bundles	54.00-55.00
No. 2 bundles	39.00-40.00
No. 1 busheling	54.00-55.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Low phos.	57.00-58.00
Cut structural plates 2 ft and under	*58.00-59.00*
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	56.00-57.00

Cast Iron Grades

No. 1 cupola	57.00-58.00
Charging box cast	47.00-48.00
Stove plate	53.00-54.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	33.00-34.00
Brake shoes	43.00-44.00
Clean auto cast	57.00-58.00
Burnt Cast	43.00-44.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt	60.00-61.00
R.R. malleable	65.00-66.00
Rails, 2 ft and under	73.50-74.50
Rails, 18 in. and under	72.00-73.00
Rails, random lengths	68.00-69.00
Cast steel	61.00-62.00
Railroad specialties	62.00-63.00
Uncut tires	63.00-64.00
Angles, splice bars	68.00-69.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	57.00-58.00
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	57.00-58.00
No. 2 bundles	*40.00-41.00*
No. 1 busheling	57.00-58.00
Machine shop turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Low phos.	59.00-60.00
Electric furnace bundles	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt	64.00-65.00

CHICAGO

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 factory bundles	*55.00-56.00*
No. 1 dealer bundles	*51.00-52.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*51.00-54.00*
Machine shop turnings	29.00-31.00
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Cut structurals, 3 ft	*56.00-57.00*
Punchings & plate scrap	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Stove plate	46.00-47.00
Unstripped motor blocks	40.00-41.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	*55.00-56.00*
R.R. malleable	63.00-64.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	74.00-75.00
Angles, splice bars	66.00-67.00
Rails, rerolling	72.00-73.00

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*50.00*
No. 2 bundles	*33.00*
No. 1 busheling	*49.00*
Machine shop turnings	24.00
Mixed borings, turnings	24.00
Short shovel turnings	28.00
Punchings & plate scrap	65.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	39.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	27.00
Clean auto cast	52.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	39.00-40.00
No. 2 bundles	*31.00-32.00*
No. 1 busheling	39.00-40.00
Cast iron borings	21.50-22.50
Short shovel turnings	32.00-33.00
Machine shop turnings	31.00-32.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	52.00-53.00
Structural & plate, 2 ft	51.00-52.00
Unstripped motor blocks	37.00-38.00
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt	50.00-51.00
Rails, 18-in. and under	63.00-64.00
Rails, rerolling	65.00-66.00
Rails, random lengths	60.00-61.00
Angles, splice bars	59.00-60.00

PHILADELPHIA

No. 1 heavy melting	*56.00†*
No. 2 heavy melting	*47.00†*
No. 1 bundles	*56.00*
No. 2 bundles	*45.00†*
No. 1 busheling	*56.00†*
Electric furnace bundles	*57.00*
Mixed borings, turnings	39.00
Machine shop turnings	38.00
Short shovel turnings	42.00
Heavy turnings	52.00
Structurals & plates	*58.00-59.00*
Couplers, springs, wheels	62.00-63.00
Rail crops, 2 ft & under	*67.00*

Cast Iron Grades

No. 1 cupola	51.00-52.00
Malleable	70.00
Heavy breakable cast	54.00
Drop broken machinery	56.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	49.00-50.00
No. 2 bundles	37.00-38.00
Machine shop turnings	*28.00-29.00*
Mixed borings, turnings	31.00-32.00
Short shovel turnings	33.00-34.00
Low phos. (structural & plate)	50.00-51.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Unstripped motor blocks	33.00-35.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	320.00-325.00
18-8 borings, turnings	165.00-175.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*34.00-34.50*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	*26.00-26.50*
Mixed borings, turnings	*27.00-27.50*
Short shovel turnings	*29.00-29.50*
No. 1 cast	*43.00-43.50*
Mixed cupola cast	*41.50-42.00*
No. 1 machinery cast	*44.50-45.00*

BUFFALO

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	41.00-42.00
No. 1 bundles	*53.00-54.00*
No. 2 bundles	38.00-39.00
No. 1 busheling	*53.00-54.00*
Mixed borings, turnings	31.00-32.00
Machine shop turnings	31.00-32.00
Short shovel turnings	34.00-35.00
Cast iron borings	31.00-32.00
Low phos.	*56.00-57.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00-51.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	59.00-60.00

CINCINNATI

(Broker's buying prices; f.o.b. shipping point)

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*50.00-51.00*
Machine shop turnings	31.00-32.00
Mixed borings, turnings	31.50-32.50
Short shovel turnings	34.50-35.50
Cast iron borings	31.50-32.50
Low phos., 18 in.	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Heavy breakable cast	*46.00-47.00*
Charging box cast	*46.00-47.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt	*59.00-60.00*
Rails, 18 in. and under	*68.00-69.00*
Rails, random lengths	61.00-62.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*43.00*
No. 2 heavy melting	*40.00*
No. 2 bundles	*43.00*
No. 2 bundles	*36.00*
No. 1 busheling	*43.00*
Machine shop turnings	*26.00*
Short shovel turnings	*27.00*

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	*41.00*
Heavy breakable cast	*39.00*
Unstripped motor blocks	*39.00*
Brake shoes	45.00
Clean auto cast	47.00
Stove plate	*42.00*

Railroad Scrap

No. 1 R.R. heavy melt	*56.00*
Rails, 18 in. and under	*69.00*
Rails, random lengths	*64.00*
Rails, rerolling	*71.50*
Angles, splice bars	*57.00*

SEATTLE

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*36.00-38.00*
No. 1 bundles	*36.00-38.00*
No. 2 bundles	*28.00-30.00*
No. 1 bundles	*20.00*
Machine shop turnings	*23.00-25.00*
Mixed borings, turnings	15.00-16.00
Electric furnace No. 1	52.00-55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*40.00-43.00*
Heavy breakable cast	*37.00*
No. 1 wheels	*37.00*
Unstripped motor blocks	*38.00-41.00*
Stove plate (f.o.b. plant)	*38.00-41.00*
Brake shoes	*38.00*

Railroad Scrap

Rails, random lengths	*40.00*

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
Machine shop turnings	17.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00

SAN FRANCISCO

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*37.00*
No. 1 bundles	*39.00*
No. 2 bundles	*32.00*
No. 1 busheling	*40.00*
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Heavy turnings	20.00-23.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	*48.00*
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	*48.00*
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT.

No. 1 heavy melting	50.50
No. 2 heavy melting	46.50
No. 1 bundles	50.50
No. 2 bundles	43.00
Mixed steel scrap	44.50
Mixed borings, turnings	24.00
Rails, remelting	58.50
Busheling, new factory:	
Prepared	48.50
Unprepared	44.50
Short steel turnings	27.50

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

look to

Luria Brothers & Co., Inc.

for complete

Service & Coverage

of

STAINLESS STEEL SCRAP

NICKEL-CHROME SCRAP

Luria Brothers and Company, Inc.

main office **PHILADELPHIA NATIONAL BANK BUILDING,** *Phila. 7, Pa.*

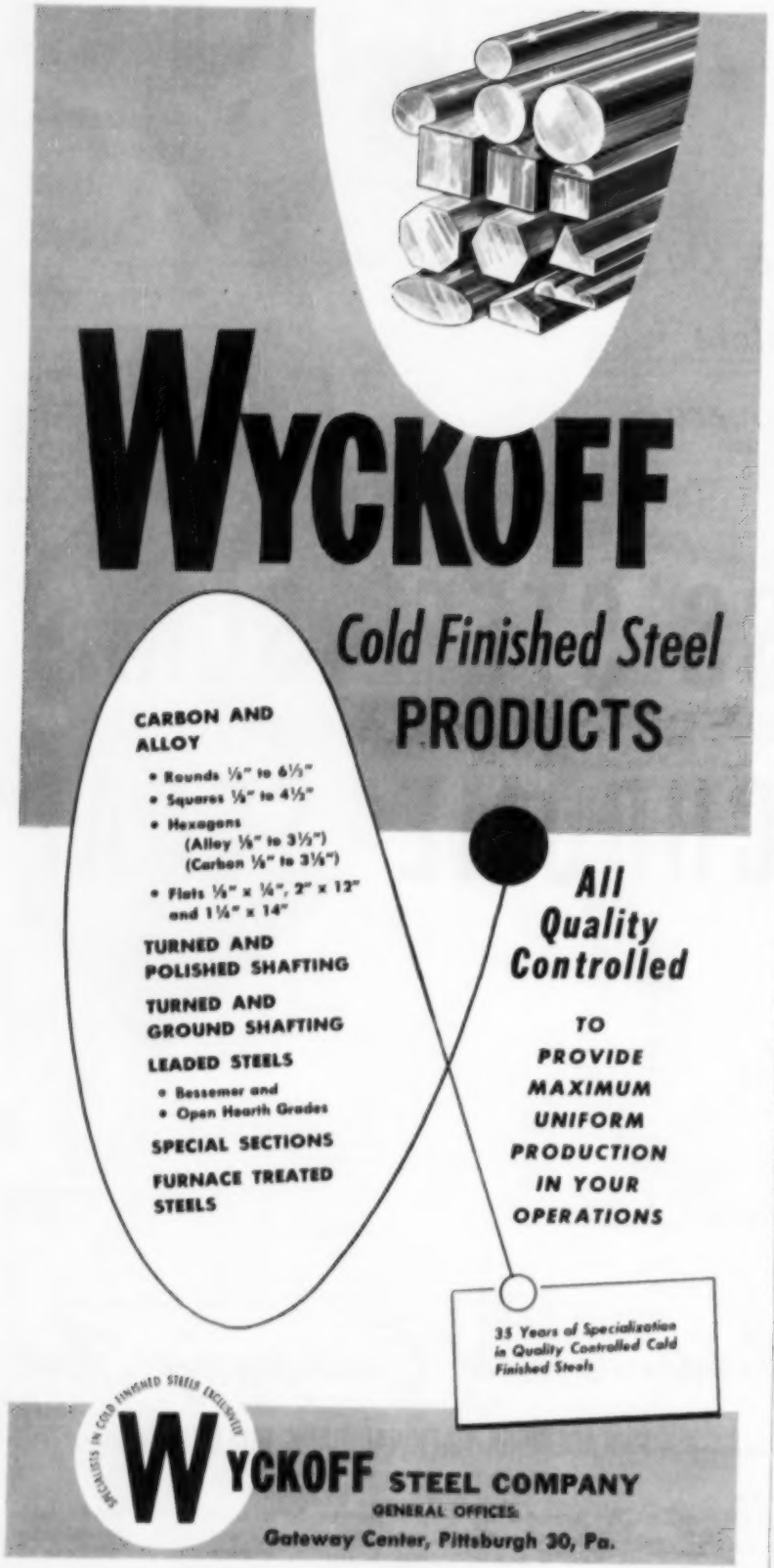
PLANTS

LEBANON, PENNA. — DETROIT (ECORSE), MICHIGAN
READING, PENNA. — PITTSBURGH, PENNA.
MODENA, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA. — CLEVELAND, OHIO — LOS ANGELES, CAL. — READING, PENNA.
BOSTON, MASS. — DETROIT, MICHIGAN — NEW YORK, N. Y. — ST. LOUIS, MISSOURI
BUFFALO, N. Y. — HOUSTON, TEXAS — PITTSBURGH, PENNA. — SAN FRANCISCO, CAL.
CHICAGO, ILLINOIS — LEBANON, PENNA. — PUEBLO, COLORADO — SEATTLE, WASH.
MONTREAL, CANADA

IMPORT & EXPORT – **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**


WYCKOFF
Cold Finished Steel
PRODUCTS
CARBON AND ALLOY
• Rounds ⅛" to 6½"
• Squares ⅛" to 4½"
• Hexagons
(Alloy ⅛" to 3½")
(Carbon ⅛" to 3¼")
• Flats ⅛" x ¼", 2" x 12" and 1¼" x 14"
TURNED AND POLISHED SHAFTING
TURNED AND GROUND SHAFTING
LEADED STEELS
• Bessemer and
• Open Hearth Grades
SPECIAL SECTIONS
FURNACE TREATED STEELS
All Quality Controlled
TO PROVIDE MAXIMUM UNIFORM PRODUCTION IN YOUR OPERATIONS
35 Years of Specialization in Quality Controlled Cold Finished Steels
SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY
WYCKOFF STEEL COMPANY
GENERAL OFFICES
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa.—Chicago, Ill., Newark, N.J.—Putnam, Conn.

(Continued from page 217)

Blast furnace and cast scrap prices are unchanged.

Chicago — Activity in the scrap market picked up last week with mills placing orders for "fair tonnages." Prices generally slumped, amounting to about $3 on heavy melting grades. Weakness was attributed to brokers' fear of a possible steel strike and mills' reluctance to pay the recent high asking prices.

Cincinnati—Scrap prices are easing. Most open-hearth and cast grades are off $2. Material is flowing easily at the reduced price levels. Most mills have ample supplies.

Detroit—The local market on steelmaking grades of scrap is weak, with the supply exceeding demand. No. 1 heavy melting and bundles are lower at $50; No. 2 heavy melting, $42; No. 1 busheling, $49; and No. 2 bundles, $33. Prospects are that the market will seek still lower levels.

St. Louis—Brokers' scrap buying prices were sharply off the last week, almost every category showing a drop of from $1 to $4. Cast iron grades were hardest hit. Rail scrap, heavy melt, bundles and turnings were also down.

High prices of the last month brought out plenty of scrap, which is moving in such quantity to the mills it is sometimes hard to make sales. The market here is expected to slip more, especially in higher priced grades like railroad offerings. Dealer grades are not likely to go off much more. In one instance, shipments were suspended because scrap was coming in too fast. Mills are doing some stockpiling.

Birmingham—The scrap market is quiet, but strong. Purchase of open-hearth scrap last week was limited to No. 2 grades by two nearby mills. Both bought No. 2 heavy melting for $40, delivered. This is equivalent to $38, delivered Birmingham. No. 2 bundles were bought in limited quantities at $32. The electric furnace market continues strong, with some railroad items on recent purchases bringing the highest prices of the year. The export market is a little quieter. Cast prices are steady.

San Francisco—Coming as no surprise, prices of steel scrap have been boosted $4 to $7 a ton on top grades. No. 1 heavy melting went to $40 from $36. The modern high ($44) was reached in early January. Biggest increase was in No. 2 heavy melting, up $7 to $37. No. 1 cupola cast jumped $3, to $48.

Seattle — Battle lines have been closely drawn between domestic consumers and scrap exporting interests. The result is that dealers' quoted prices are not representative; mills

will not release prices. It is difficult to determine an accurate price level. Each purchase is on an individual basis.

Dealers quote No. 1 heavy melting at $40; No. 2, $36 to $38; No. 1 bundles, $36 to $38; No. 2 bundles, $28 to $30; borings and turnings, $23 to $25; No. 1 cupola cast, $40 to $43; heavy breakable cast, $37; and unstripped motor blocks, $38 to $41.

Iron Ore . . .

Iron Ore Prices, Page 212

Lake Superior iron ore shipments totaled 5,674,112 tons in April, a gain of 1,916,106 tons over April, 1955, shipments, says Lake Superior Iron Ore Association, Cleveland. Of last month's total, 5,601,486 tons were shipped from U. S. ports and 72,626 tons from Canadian ports.

Import Steel Prices Rise

New York—Reflecting the stringency in domestic supply, demand for foreign structural shapes is exceedingly strong. Wide flange beams are virtually unobtainable, and the supply of standard shapes abroad is becoming so tight that American buyers are working in European specifications where they can, if unable to obtain standard American sizes abroad.

Good demand prevails despite extended deliveries. Western European mills are quoting channels, beams and large angles at five to seven months. Where wide flange beams can be had for delivery within such a range, prices are virtually prohibitive.

Standard structural angles are up 25 cents per 100 lb to $7.05 at Atlantic and Gulf ports, and $7.25 at Pacific ports; I-beams, to $7.45 and $7.85.

European plates are in strong demand with deliveries on 1-in. thickness and over ranging five to six months. Prices are unchanged. Wire rods are another fairly scarce item, with delivery promises ranging four to five months. Thomas Commercial No. 5 is up 10 cents per 100 lb; open-hearth, cold-heading quality No. 5 is unchanged. Nails are up 10 cents, although delivery can be had within two months.

Prices on merchant bars and hot-rolled bands are unchanged, with deliveries ranging around eight to nine weeks. Bar size angles are off 5 cents per 100 lb to $6.75 at Atlantic and Gulf ports and $7.15 at Pacific ports. Furring channels are available within six weeks, with prices easier at Atlantic and Gulf ports, but unchanged on the West Coast.

WORKS MANAGER

We are seeking a man to direct all manufacturing for our company, which is located in a good small Eastern city. Our reputation for quality is excellent, our operations have been profitable over many years and annual sales volume is now about $10,000,000.

Iron or Steel Foundry experience essential

We would like a man who has directed the manufacturing of medium and heavy industrial metal products. A man with the right potential can look forward to becoming general manager in the near future. Age should be between 40 and 55 years. Salary will be in the $20,000 to $25,000 range.

State briefly pertinent experience, age and home telephone. All replies confidential.

Box 421, STEEL

Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

FOR SALE—HIGH VOLTAGE X-RAY UNIT Kelly-Koett 400 kv constant potential x-ray generator having full wave rectification and output of 20 roentgens per minute, using 7 mm of copper filtration. Adaptable for industrial radiography. Write Box 422, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

WANTED: FORGING CHIEF ENGINEER Opening at once in mid-west forging company for this man: Age 45-55. Must know die sinking and die design and come from independent rather than captive shop. Will have supervision of die room foreman and engineering staff. Will report direct to president. Company employing 110 men. Equipment Chambersburg board hammers up through 3000 lbs. Please state experience and present compensation. Your letter will be treated with absolute confidence. Write Box 424, STEEL, Penton Bldg., Cleveland 13, Ohio.

Accounts Wanted

MANUFACTURER'S REPRESENTATIVE. Well established in St. Louis area with large number of regular repeat customers in industrial field. Wants to represent on a commission basis another reputable company requiring above average representation with product or service of real merit. Write Box 417, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PURCHASING AGENT: Nine years purchasing experience buying steel and component parts farm implement manufacturer, desires employment with future. Experienced office management. Excellent references. Married, age 30. Write Box 425, STEEL, Penton Bldg., Cleveland 13, Ohio.

TOOL ENGINEER. Die design experience deep draws and high production progressive dies. Age 47 B.S. Degree. Write Box 416, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.

FOR SALE

One 2,000 pound CECO DROP HAMMER. New in 1952. Used six months.

Reply Box 420, STEEL

Penton Bldg. Cleveland 13, Ohio

FOR SALE

10 Thousand Hard Maple Spools
4 inch traverse—1⅝ inch barrel
4 inch head—⅝ inch arbor
Usable condition—will consider reasonable offer.

KEYSTONE WIRE CLOTH COMPANY
Hanover, Pennsylvania

ROLLING MILL WANTED

We want to buy a hand mill capable of producing steel reinforcing bars from billets of up to 4" x 4". Write, giving details, to

Box 423, STEEL

Penton Bldg. Cleveland 13, Ohio

HELP WANTED

Metallurgists: Company engaged in basic process and pyrometallurgy requires several men for Production, Development and Quality Control who have some experience in one or more of the following: Smelting and Refining, Steelmaking or Electric Furnace Operation. Excellent opportunities for qualified men. Hospitalization, insurance and pension plan provided by Company. Plants located midwest, north and south. All replies held strictly confidential. Submit details resume to Box 413, STEEL, Penton Bldg., Cleveland 13, Ohio.

STRUCTURAL DETAILERS

Permanent positions for structural draftsmen having at least three years experience, with structural steel fabricators, on bridge and building work. Modern air-conditioned office with all employe benefits.

St. Joseph Structural Steel Co.,
Box 68, Station A, St. Joseph, Mo.

ENGINEERING EXECUTIVE

Rapidly expanding steel company has opening for engineer whose administrative qualifications include the supervision of design, construction and layout of rolling mills—blast furnaces and steel making facilities.

Here is an outstanding opportunity if your abilities and experience meet the needs of this position.

Send complete resume, including salary requirements, to:

Box 415, STEEL

Penton Bldg. Cleveland 13, Ohio

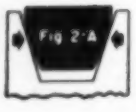
Concave sides make V-belts last longer

The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.



Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

—World's Largest Maker of V-Belts

TPA 88

Gates Vulco Rope Drives

Advertising Index

Abell-Howe Co. 172
Ajax Electric Co. 11
Allegheny Ludlum Steel Corporation 44
Allied Research Products, Inc. 28
Allis-Chalmers 57, 58
Allis, Louis, Co., The 42
Allison Division, American Chain & Cable 142
Alloy Metal Wire Division, H. K. Porter Company, Inc. 178
Aluminum Company of America 6
American Chain & Cable, Allison Division 142
American Machine & Foundry Co., Cleveland Welding Division 197
American Schiess Corporation, Engineering Division 36
American Smelting & Refining Co., Federated Metals Division 182
American Steel & Wire Division, United States Steel Corporation 17, 195
Arcos Corporation 170, 171
Armco Steel Corporation 64
Arwood Precision Casting Corporation 180
Associated Spring Corporation 30
Associated Steel Corporation 216
Atlantic Refining Co., The 51
Avey Drilling Machine Co., The 14, 15

Babcock & Wilcox Co., The, Refractories Division 137
Bakelite Co., A Division of Union Carbide & Carbon Corporation 91
Barber-Colman Co., Hendey Machine Division 104, 105
Barnes-Gibson-Raymond, Division of Associated Spring Corporation 30
Barnes, Wallace, Co., Division of Associated Spring Corporation 30
Barnes, Wallace, Co., Ltd., The, Division of Associated Spring Corporation 30
Bethlehem Steel Co. 1, 224
B-G-R Cook Plant, Division of Associated Spring Corporation 30
Bishop, J., & Co. Platinum Works, Stainless Steel Products Division 187
Blaw-Knox Co., Foundry & Mill Machinery Division 93
Bliss, E. W., Co. 43
Bucyrus-Erie Co. 133
Bullard Co., The 80

Cadman, A. W., Mfg. Co. 216
Carboloy Department of General Electric Co. 140, 141
Carborundum Co., The, Refractories Division 101
Carpenter Steel Co., The 163
Cattie, Joseph P., & Brothers, Inc. 216
Century Electric Co. 206
Chambersburg Engineering Co. 216
Chandler Products Corporation 103
Chemstone Corporation 129
Clark Controller Co., The 147
Cleveland Cap Screw Co., The 209
Cleveland Hotel 86
Cleveland Punch & Shear Works Co., The 192
Cleveland Welding Division, American Machine & Foundry Co. 197
Cleveland Worm & Gear Co., The Inside Back Cover
Climax Molybdenum Co. 13
Cold Metal Products Co., The 63
Colorado Fuel & Iron Corporation, The 46, 47, 131, 154, 155
Columbia-Geneva Steel Division, United States Steel Corporation 17, 195
Copperweld Steel Co., Steel Division 83
Coulter, James, Machine Co., The 214
Cowles Tool Co. 162
Crucible Steel Company of America 158
Cutler-Hammer, Inc. Back Cover

Damascus Tube Co. 216
De Laval Steam Turbine Co. 41
Detrex Corporation 188
DeVilbiss Co., The 94, 95
Diamond Manufacturing Co. 86
Disston, Henry, Division, H. K. Porter Company, Inc. 169
Dodge Manufacturing Corporation 138, 139
Drave Corporation 179
Dresser Industries, Inc., Dresser Manufacturing Division 214
Dunbar Brothers Co., Division of Associated Spring Corporation 30
Du Pont, E. I., de Nemours & Co., Inc. 31

Eastern Machine Screw Corporation, The 216
Eaton Manufacturing Co., Foundry Division 99
Electric Controller & Mfg. Co., The, Division of Square D Co. Inside Front Cover
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 54

Fate-Root-Heath Co., The, Plymouth Locomotive Works Division 59

Federal-Mogul Division, Federal-Mogul-Bower Bearings, Inc. 184
Federated Metals Division of American Smelting & Refining Co. 182
Firth Sterling, Inc. 164
Formed Tubes, Inc. 210
Fort Pitt Bridge Works 185

Gardner-Denver Co. 102
Gardner Machine Co. 29
Garlock Packing Co., The 148
Gates Rubber Co., The 222
General Electric Co. 38, 39
General Electric Co., Carboloy Department 140, 141
Gibson, William D., Co., The, Division of Associated Spring Corporation 30
Gisholt Machine Co. 8, 9
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 4
Greenlee Bros. & Co. 45

Halliden Machine Co., The 174
Harco Corporation, The 211
Haynes Stellite Co., A Division of Union Carbide & Carbon Corporation 37
Hendey Machine Division, Barber-Colman Co. 104, 105
Heresite & Chemical Co. 150
Hyde Park Foundry & Machine Co. 223

Industrial Brownhoist Corporation 52
Ingersoll-Rand 145

Jones & Laughlin Steel Corporation 76

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Chemicals Division 166, 167
Kendall Co., The, Polyken Sales Division 53
Kennametal, Inc. 22
Keystone Wire Cloth Co. 221

Laclede-Christy Co. Division, H. K. Porter Company, Inc. 176
Laminated Shim Co., Inc., Stampings Division 10
Landis Machine Co. 7
La Salle Steel Co. 149
Link-Belt Co. 32, 33
Lurie Brothers & Co., Inc. 219

McKay Machine Co., The 75

Macwhyte Co. 3
Mahon, R. C., Co., The 181
Manning, Maxwell & Moore, Inc. 98
Monross, F. N., & Sons Co., Division of Associated Spring Corporation 30
Marchant, Geo. F., Co. 162
Metal Blast, Inc. 56
Micromatic Hone Corporation 48
Micro Switch, A Division of Minneapolis-Honeywell Regulator Co. 132
Milwaukee Division of Associated Spring Corporation 30
Minneapolis-Honeywell Regulator Co., Micro Switch Division 132
Minnesota Mining & Mfg. Co. 190
Minnesota Mining & Manufacturing Co., Adhesives & Coatings Division 21
Morgan Engineering Co., The 26
Morse Twist Drill & Machine Co. 24, 25

National Acme Co., The 165
National Malleable & Steel Castings Co. 144
National Steel Corporation 49
National Tube Division, United States Steel Corporation 17
Nilson, A. H., Machine Co. 106
Norton Co. 23

Oakite Products, Inc. 186
Ohio Division of Associated Spring Corporation 30
Orban, Kurt, Co., Inc. 36

Peterson Steels, Inc. 100
Pittsburgh Steel Co. 34, 35
Plymouth Locomotive Works, Division of The Fate-Root-Heath Co. 59
Pollock, William B., Co., The 173
Polyken Sales Division, The Kendall Co. 53
Porter, H. K., Company, Inc., Alloy Metal Wire Division 178
Porter, H. K., Company, Inc., Henry Disston Division 169
Porter, H. K., Company, Inc., Laclede-Christy Division 176

Raymond Manufacturing Co., Division of Associated Spring Corporation 30
Ray-O-Vac Co., Willson Products Division 12
Ready-Power Co., The 151
Remington Rand Division of Sperry Rand Corporation 115
Republic Steel Corporation 134, 135
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 131
Rolock, Inc. 199
Ruby Chemical Co. 217
Ryerson, Joseph T., & Son, Inc. 66

St. Joseph Structural Steel Co. 221
Seaboard Coil Spring Division of Associated Spring Corporation 30
Sheffield Corporation, The 116
Shenango-Penn Mold Co., Centrifugal Castings Division 27
Simonds Abrasive Co. 55
Simonds Gear & Mfg. Co., The 16
SKF Industries, Inc. 2
Somers Brass Co., Inc. 87
Sperry Rand Corporation, Remington Rand Division 115
Square D Co., The Electric Controller & Mfg. Co. Division Inside Front Cover
Standard Pressed Steel Co., Socket Screw Division 80
Standard Tube Co., The 191
Surface Combustion Corporation 78

Tainer, Roland, Co., Inc. 8
Tennessee Coal & Iron Division, United States Steel Corporation 17, 195
Texas Co., The 60
Thilmany Pulp & Paper Co. 160
Timken Roller Bearing Co., The, Steel & Tube Division 84
Timmerman Products, Inc. 88
Tomkins-Johnson Co., The 168

Ulbrich Stainless Steels 189
Union Carbide & Carbon Corporation, Bakelite Co. 91
Union Carbide & Carbon Corporation, Electro Metallurgical Co. 54
Union Carbide & Carbon Corporation, Haynes Stellite Co. 37
United Engineering & Foundry Co. 183
United States Graphite Co., The, Division of The Wickes Corporation 127
United States Rubber Co., Mechanical Goods Division 125
United States Steel Corporation, Subsidiaries 17, 18, 19, 20, 195
United States Steel Export Co. 17, 195
United States Steel Supply Division, United States Steel Corporation 17, 20
Upson-Walton Co., The 217

Vaughn Machinery Co., The 157

Walker-Turner, Inc. 177
Wallingford Steel Co., The 146
Washington Steel Corporation 143
Weirton Steel Co. 49
Westinghouse Electric Corporation 96, 97
Wheelabrator Corporation 215
Wheeling Steel Corporation 175
Wheelock, Lovejoy & Co., Inc. 136
Wickes Corporation, The, The United States Graphite Co. Division 127
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 46, 47
Willson Products Division, Ray-O-Vac Co. 12
Wyckoff Steel Co. 220

Youngstown Sheet & Tube Co., The 40

~ ~ ~

Table of Contents, Page 5

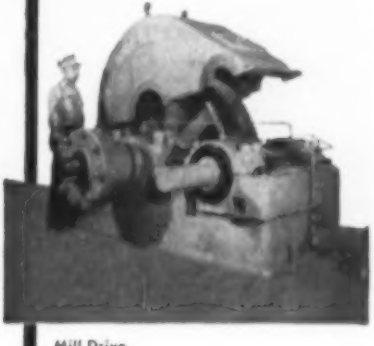
Classified Advertising, Page 221

Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.



Mill Drive

Machine Castings
Lathe Beds
Housings
Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.

ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

Voices under the sea

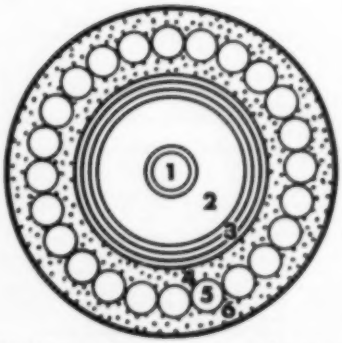
Late last summer *HMTS Monarch*, British cable ship, completed the ticklish job of laying the first of twin telephone cables some 2,250 miles across the Atlantic, from Newfoundland to Scotland. When the second cable is laid during the coming summer, it will mark the establishment of the first trans-Atlantic telephone system.

This joint venture of American, British and Canadian interests will make it possible for your voice to travel to Europe as clearly as in a telephone chat with a neighbor. The new cables will carry up to 36 conversations at the same time. Service is to be inaugurated by late 1956.

Major strength element of the new cables is a spiral wrapping of 24 steel armor wires, for which Simplex Wire and Cable Company, cable manufacturers, used a quantity of bethanized wire. Developed by Bethlehem, bethanized wire is electrolytically coated with pure zinc. The coating is uniform, highly ductile, and tightly bonded to the steel wire.

A number of underwater cables have been armored with bethanized wire. And that's just one of hundreds of uses for this unique wire. Capable of being severely formed, bethanized wire is available with light, medium, and heavy coatings which provide excellent corrosion-resistance.

We suggest you let us arrange a trial order. Our nearest sales office will gladly give you full details.

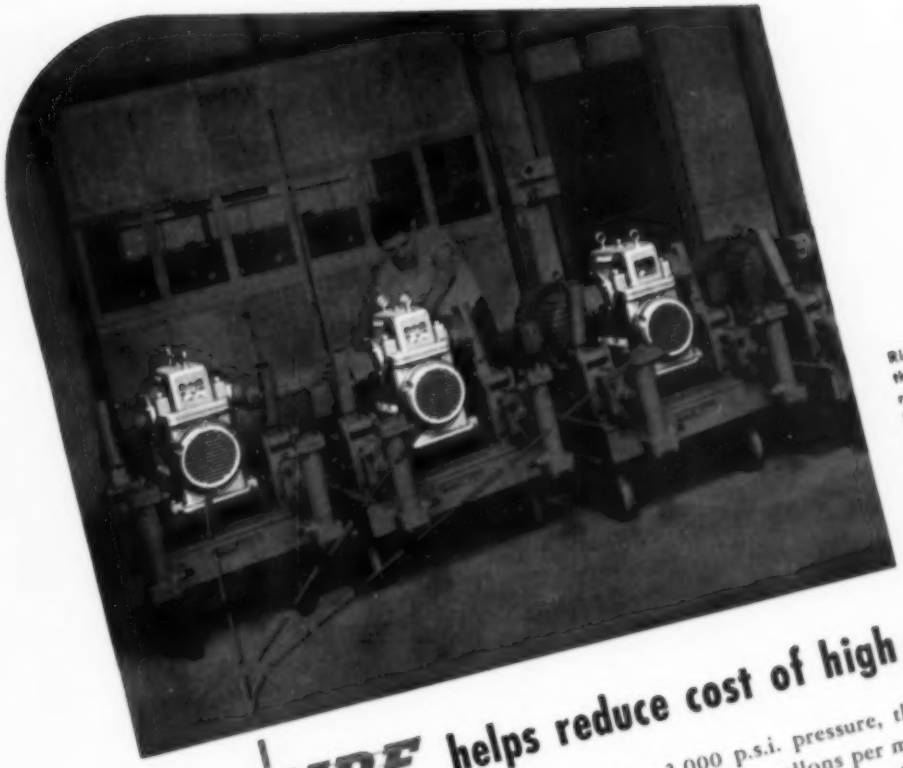


This drawing shows the structural features of the 1¼-in. diam type D cable used in deep water. 1—Copper center wire and surround tapes. 2—Polyethylene insulation. 3—Copper return tapes, teredo tape and telconax tape. 4—Jute bedding. 5—24 steel armor wires. 6—Two servings of jute. Heavier types of cable construction are used in shallow water.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM WIRE

BETHLEHEM STEEL



Right off the assembly line, these Philadelphia Pumps are ready for action. Driven by Speedaire . . . these rugged, heavy-duty pumps are assured of a sturdy power source.

SPEEDAIRE helps reduce cost of high pressure pump

DESIGNED to operate at 3,000 p.s.i. pressure, this 50% metal slurry pump delivers 3 gallons per minute. Built to handle tough, unusual jobs, it is driven by a tough, unusual speed reducer—the Cleveland Speedaire. Not only did Speedaire offer the smaller frame size needed for this unit, it also helped substantially to reduce its price. Speedaire costs hundreds of dollars less than a conventional drive of comparable capacity.

Further, the fan-cooled Speedaire worm gear reducer runs cool and smoothly under a heavy load, unaffected by heat, moisture and grime. Thousands are in service. Chances are you can use one or more right now! If you aren't familiar with Speedaire, just call us. Ask for a copy of Catalog 400. The Cleveland Worm and Gear Co., 3270 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

Now...A Safety Switch Built to the Standards of Cutler-Hammer Three-Star Motor Control

☆ *installs easier*

☆ *works better*

☆ *lasts longer*

New Bulletin 4105 Safety Switch Type A, 30 to 1200 Amp. Sizes

Engineered for "heat-proof" dependability. New design for minimum internal heat generation; new materials for heat immunity.

Automatic pressure fuse receivers; no screws to forget to tighten . . . no screws to loosen in service by alternate expansion and contraction.

Visible blades for quick and sure inspection at all times. New double insulated steel operating hook. Safety is important in safety switches.

Panel mounted mechanism of this new Bul. 4105 Safety Switch is readily interchangeable with that of the old Bul. 4101 to permit replacements without case and conduit work.

The new Cutler-Hammer Three-Star Motor Control has proved a sensation wherever it has been tested in comparison with any other control equipment. The tougher the tests, the more dramatic has been its demonstrated superiority. A kaolin processing plant in Georgia, for example, reports: "Because of the hard service we give motor control in our plant, we have always had to replace contacts every 30 to 60 days. Our first Three-Star Control unit has now been in daily use for *thirteen months* and its original contacts still look and work like new." A lumber mill in California says: "Control contacts have always been a problem on our drive of the feed chain going to the trim saw. We had to replace contacts every few weeks. Our first Three-Star Control on this job, purchased from the stock of our local Cutler-Hammer distributor, is now in its *twenty-fourth month* of continuous daily operation with its original contacts still in service."

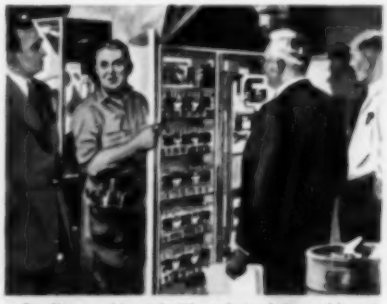
Such control equipment brings important operating dependability and savings to any job where an electric motor is used. But it also means that such better motor control should be matched with a safety switch which can equal the performance of the motor control. And now this is possible. Cutler-Hammer Authorized Distributors are now stocked and ready to serve you with the new Bul. 4105 Safety Switch, the safety switch built to the standards of Cutler-Hammer Three-Star Motor Control. It is loaded with new features. See it. Try it. Prove it. Order one today.

CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H

Cutler-Hammer Three-Star Motor Control can now be obtained in every needed form

Cutler-Hammer Authorized Distributors carry stocks of Three-Star Motor Control in sizes and types of enclosures to meet all the usual industrial needs.



Leading machinery builders equip their machines with Cutler-Hammer Three-Star Motor Control as standard original equipment, often as components on panels.

The new Cutler-Hammer Three-Star Unitrol provides for the quickest installation or rearrangement of the finest in control equipment, C-H Three-Star Motor Control.